HNOLOGY DEPT.

Gas Journal

OL. 277. 106TH YEAR. LONDON, JANUARY 13, 1954 NO. 4728. PRICE 1/3

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DETROIT

A "Pride" of Packings

A gaggle of geese, a brace of pheasants, a murmuration of starlings and, we venture to suggest with over 70 years' experience of their manufacture, a "Pride" of Packings.

Packings! What a multiplicity of choice in types and sizes confronts the maintenance engineer and confounds the catalogues of his suppliers!

In an endeavour to simplify matters our research has been directed to the production of a packing which will fit any gland and fulfil most services. Hence—

BESTOBELL P.35 SAFETY PACK

"Safety Pack" is made from the longest and toughest self-lubricating asbestos fibres combined with other temperature and chemical resisting media, according to the service required. It can be used in either fibrous form or in pre-formed split or solid rings.

"Safety Pack" is suitable for superheated steam at 1000 p.s.i. and 1000°F., and gives excellent results on high pressure hot water; hot tars and hydro-carbons; solvents and acids; fuel oil and gas; slurries and sewage; lyes and most chemicals. It has proved highly successful in a variety of packing problems although it cannot, of course, always replace specialised packings of conventional type designed for a specific purpose.

"Safety Pack" is in use in over 100 power stations in Great Britain, playing its part in conserving our coal supplies. It has been tested and proven in the majority of industries at home and abroad.

For a descriptive leaflet, a sample and technical assistance you have but to ring Bell's.

BESTOBELL

Bell's Asbestos and Engineering Limited

Bestobell Works Slough Bucks

(Telephone: Slough 25151)

One of the 150 h.p.

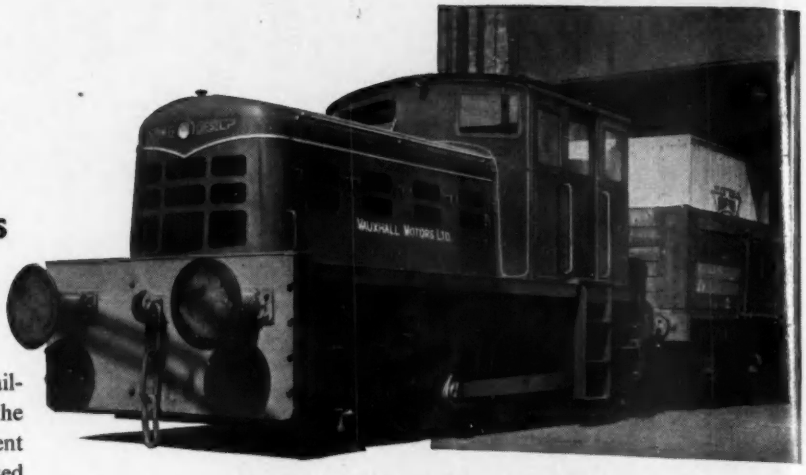
FOWLER

Diesel Locomotives

at Vauxhall Motors Ltd.

Luton

THIS 150 h.p. supplies instantly available motive power. It provides the quick and efficient wagon movement which is a pre-requisite for increased overall productivity.



FOWLER LEEDS

DIESEL LOCOMOTIVES

In rail gauges from 2 ft. — 5 ft. 6 ins.

Information and literature from

John Fowler & Co. (Leeds) Ltd., Leeds, Yorks.

Telephone: Leeds 30731 (10 lines)

A PRODUCT OF THE MARSHALL ORGANISATION GAINSBOROUGH, ENGLAND.

Some users of Fowler Diesel Locomotives

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The

DONKIN HANSON

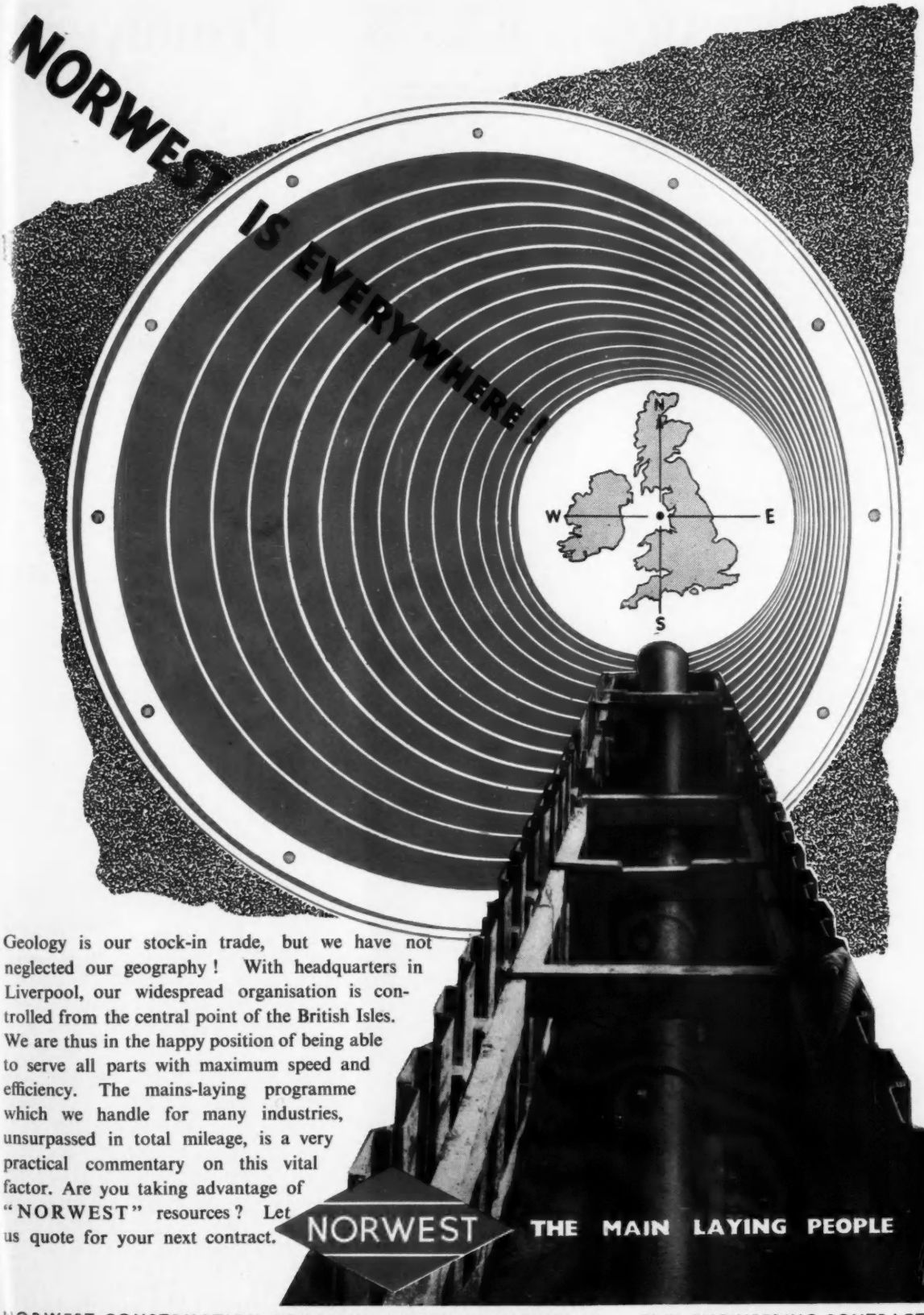
AUTO-PILOT GOVERNOR

FOR USE WITH STATION GOVERNORS

THIS PILOT GOVERNOR IS OPERATED BY AN EIGHT-DAY CLOCK, AND CHANGES THE PRESSURE TO MEET PEAK LOADS, ACCORDING TO REQUIREMENTS. A DIFFERENT LINE CAN BE GIVEN FOR EACH DAY OF THE WEEK IF REQUIRED.

The **BRYAN DONKIN CO LTD** · Chesterfield

LONDON · MANCHESTER MEMBERS OF THE SOCIETY OF BRITISH GAS INDUSTRIES



Geology is our stock-in trade, but we have not neglected our geography ! With headquarters in Liverpool, our widespread organisation is controlled from the central point of the British Isles. We are thus in the happy position of being able to serve all parts with maximum speed and efficiency. The mains-laying programme which we handle for many industries, unsurpassed in total mileage, is a very practical commentary on this vital factor. Are you taking advantage of "NORWEST" resources ? Let us quote for your next contract.

NORWEST THE MAIN LAYING PEOPLE

NORWEST CONSTRUCTION COMPANY LIMITED, LIVERPOOL 21. CIVIL ENGINEERING CONTRACTORS

CVS - 12

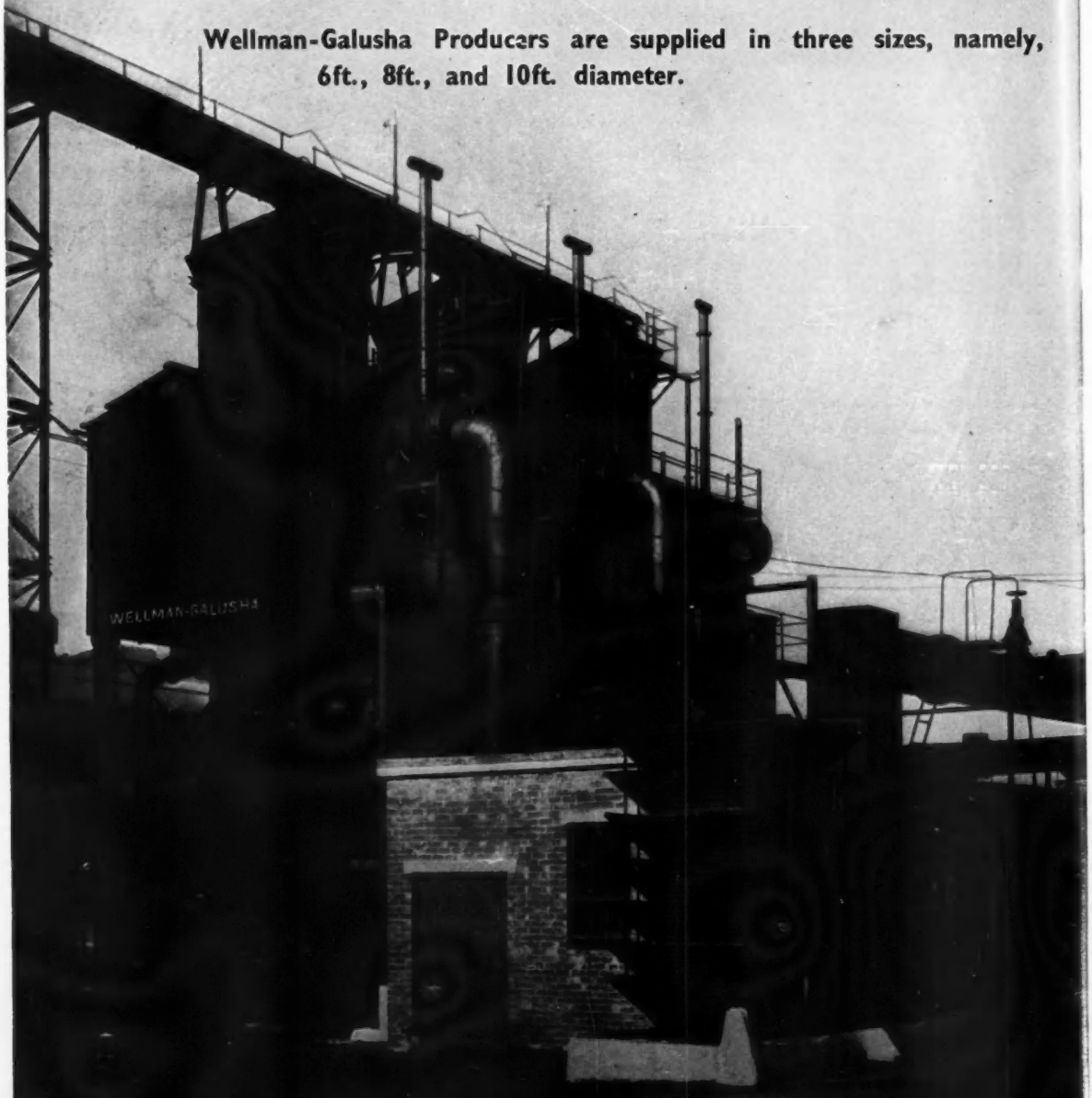
Wellman-Galusha Gas Producers

generate

High Quality Gas from Low Grade Fuels

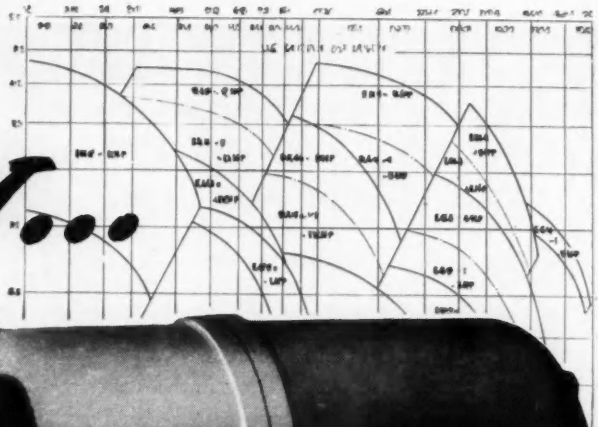
A battery of three 8ft. diameter Wellman-Galusha Gas Producers, equipped with fuel storage bins and Gas Cleaning Plant, for the efficient gasification of anthracite, coke or coke breeze.

Wellman-Galusha Producers are supplied in three sizes, namely, 6ft., 8ft., and 10ft. diameter.



THE WELLMAN SMITH OWEN ENGINEERING CORPN. LTD.
PARNELL HOUSE, WILTON ROAD, LONDON, S.W.1 WORKS: DARLASTON, SOUTH STAFFS.

It's New...



THE SIGMUND PumPak

Exclusive Features include

★ **NEW VENTILATION SYSTEM**

The ventilation design keeps the bearings cool and completely free of gland seepage along the shaft.

★ **REMOVABLE STATOR**

No fuss, no special tools, no interference with pipe connections. Loosen four nuts and draw off the stator.

- *Choice of either Mechanical Seal or Soft Packing.*
- *Choice of materials.*

The Pump with the Removable Stator

SIGMUND PUMPS LTD.

To SIGMUND PUMPS LTD.
Terminal House, Grosvenor Gardens, London, S. W. 1.
Send me, without obligation, details of the Pumpak range.

Name .....

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.....29

There's 4 MILLION FEET OF PROOF that FRANCOIS BORED PILES GIVE GREATER STRENGTH & STABILITY to foundations of every type.

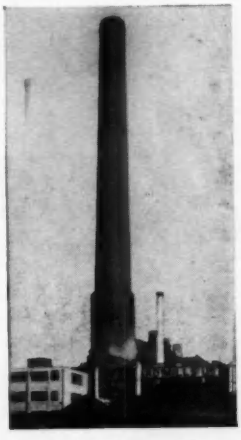
From the investigation of the site to the completion of the job, the Cementation Co. Ltd. provide a complete world-wide service on foundations and underpinning, which is unrivalled for experience, facilities and resources.

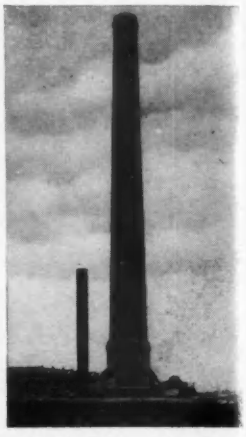
Time has proved, over and over again that concrete piles and cementation methods not only give the greatest strength and stability to many types of foundation, but are often the only solution in certain difficult conditions.

In addition there is no harmful vibration, distortion or excessive noise during construction.

The successful completion of over 4 million feet of Bored Piling during the last fifteen years is an achievement which speaks for itself.

Left : Trial borings for reconstruction of Coventry Cathedral.





Two of the largest chimneys in the British Isles; on foundations of Francois Concrete Piles (left) and Francois Cementation Piles (Right)

Write for your copy of our new booklet about Bored Piling.

The CEMENTATION COMPANY LIMITED

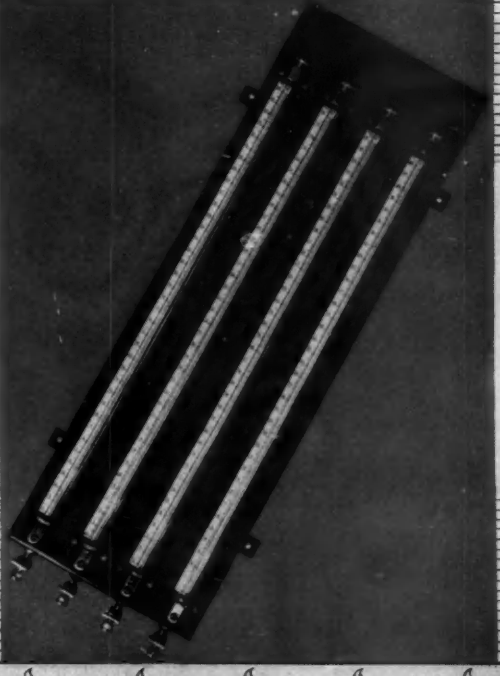
London Office : 39, Victoria St., S.W.1. Tel. ABBey 5726

BENTLEY WORKS, DONCASTER Telephone 54177-8-9

MOUNTED ON EBONY SINDANYO BOARD

SINGLE TUBE PRESSURE GAUGES

INSTRUMENTS OF PRECISION



MOUNTED ON EBONY SINDANYO

MILNE'S METERS LTD

MILTON HOUSE WORKS

EDINBURGH

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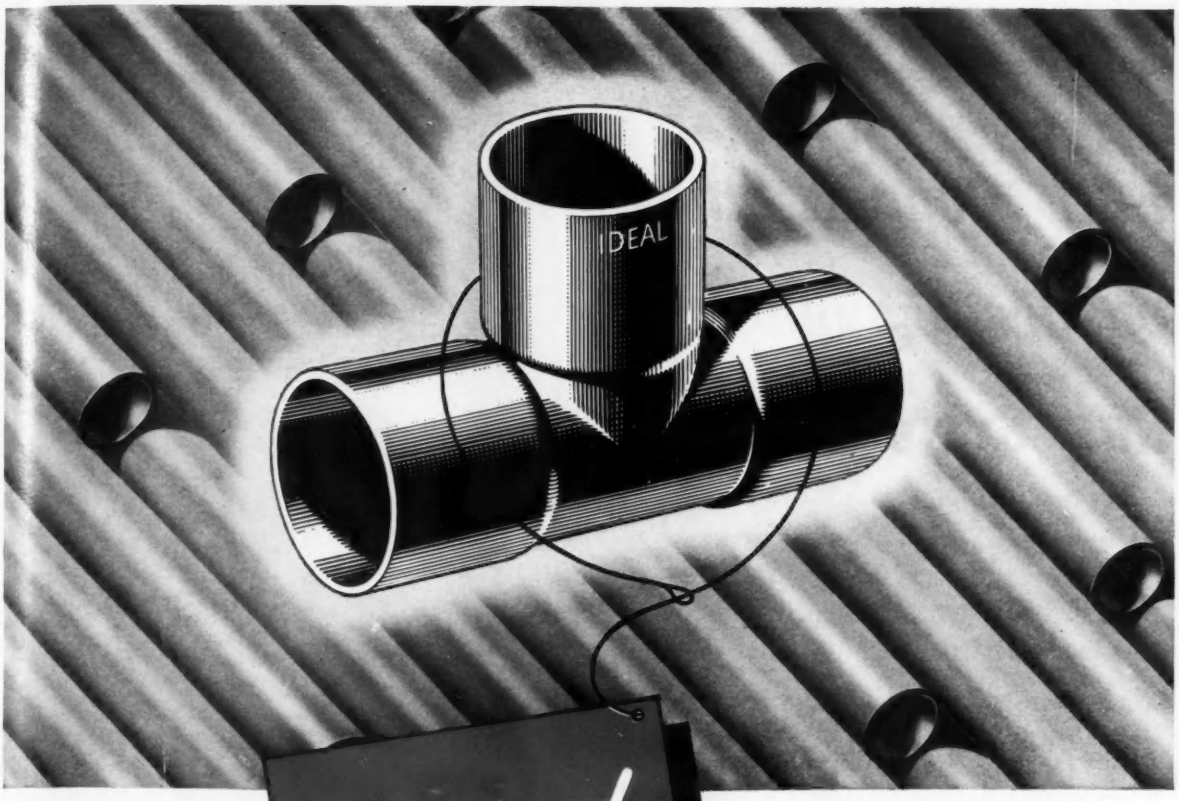
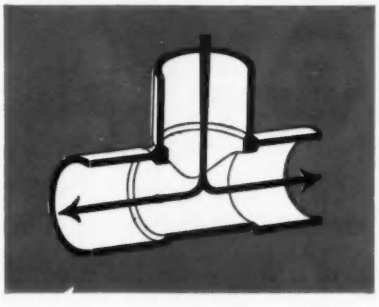
MIDLAND METER WORKS VICTORIA ROAD



Ideal *improved* full-way fittings

FOR USE WITH COPPER TUBE. Ideal Improved Full-way Fittings are TINNED THROUGHOUT and ready for immediate use. No cleaning is necessary, therefore no time is wasted by having to scour with steel wool on the inside to prepare them for soldering. This reduces the possibility of imperfect joints caused through faulty cleaning and overcomes frayed tempers or fingers brought about when working with small-bore tubes and fittings. Besides the reduction in installation costs there is less possibility of corrosion. They provide free, unrestricted flow as the tube seats against the shoulder of the sockets in the fitting and the bore is therefore flush throughout. They are unaffected by hot water or by temperatures below freezing point and the joints are actually stronger than the tube itself. Most suitable for use in confined spaces they are uniform and interchangeable and manufactured for use with light gauge copper tube to No. B.S.S. 659 and B.S.S. 1386.



A new illustrated booklet giving full details and prices of the complete range of fittings and accessories is available from our Builders' and Plumbers' Merchants' Stockists in all districts.

If there is any difficulty in obtaining a copy, please write direct to the address below.

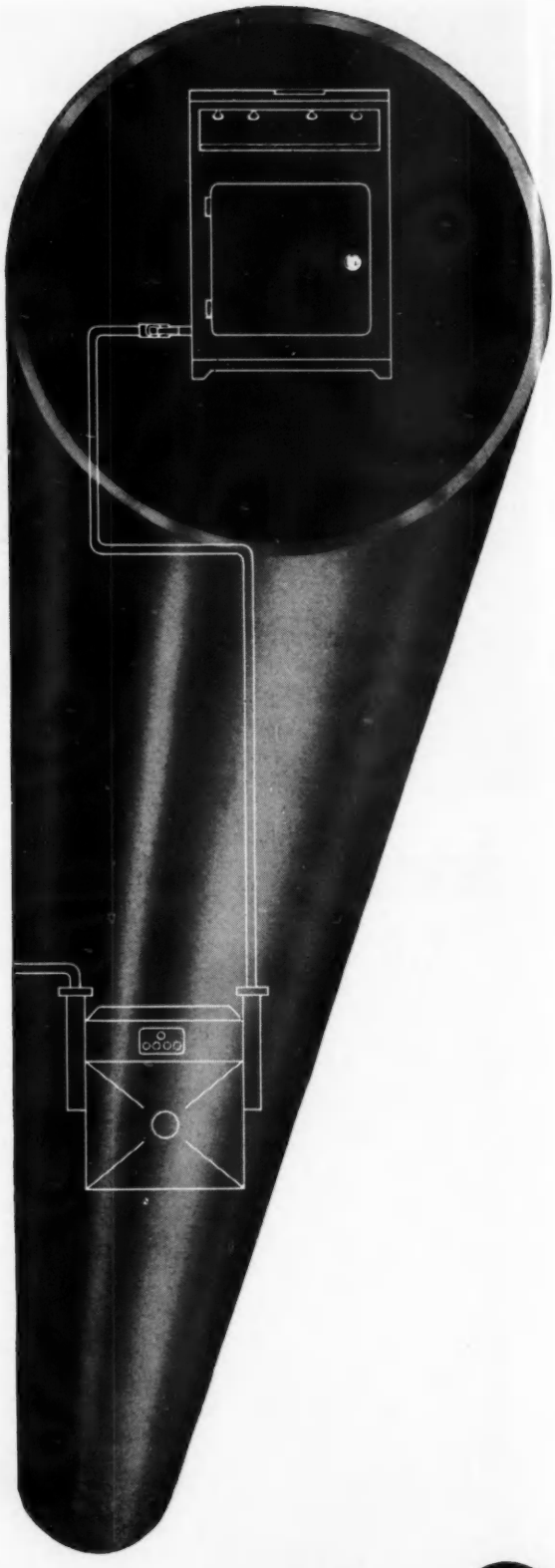
IDEAL-Standard

Manufactured by

IDEAL BOILERS & RADIATORS LTD · IDEAL WORKS · HULL

243

I.C.I. Copper tubes ensure trouble-free Gas Systems



For domestic gas systems, light gauge copper tubes made by the Metals Division of I.C.I. have five obvious advantages. They are:—

1 **Economical, both in laying costs and maintenance.**

2 **Not attacked by normal town gas.**

3 **Easily manipulated and installed.**

4 **Strong in relation to their light weight.**

5 **Neat in appearance.**

Whatever the building—farmhouse or factory; house, hotel or hospital—the job is better done with I.C.I. copper tubes.

IMPERIAL CHEMICAL INDUSTRIES LTD LONDON SW1

Fittings for copper tubes are made by Fyffe & Co. Ltd., Dundee, a subsidiary company of I.C.I.

ICI

M.204

One of a series of advertisements dealing with fundamental features of the

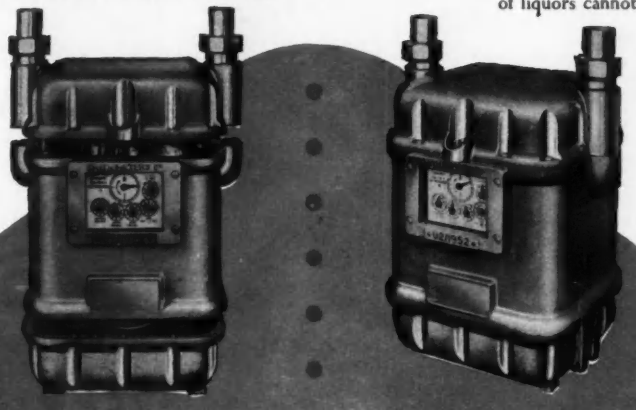
SMITH UNIVERSAL DOMESTIC METER

The design has been based on the introduction unit construction,

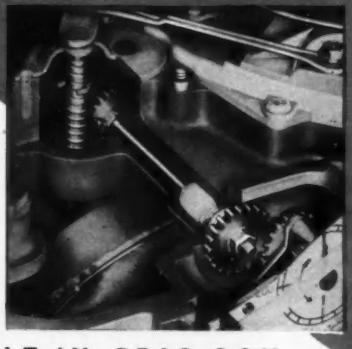
EACH COMPONENT BEING INTERCHANGEABLE

HORIZONTAL SEALING

Strong and rigid die castings in light alloy. All seals are horizontal; draining of liquors cannot attack sealing surfaces.

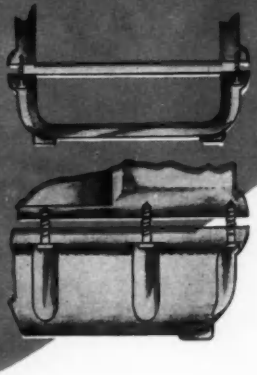


D E S I G N



BUILT-IN GEAR BOX

The gear box is built in, and a direct drive with the index is sealed from the gas flow.



EXTERNAL SEALING

screws are not in contact with the gas flow. Removal of any of these screws does not allow leakage of gas.

Precision-built in robust, anti-corrosive die casting material, the Smith Universal Domestic Meter meets the demands of all normal domestic loads. Its performance has been thoroughly tested and proved.

SMITH METERS *DOMESTIC AND INDUSTRIAL*

SMITH METERS LTD. 186 Kennington Park Rd., London, S.E.11. Phone: RELiance 2447-8-9. Grams: Smieters, Lamb, London
Works: Kennington, S.E.11 and Streatham Vale, S.W.16. Northern Sales Office: 3-4 East Parade, Leeds, 1. Phone: 23726

IN WIDE OPEN SPACES

OR CRAMPED LITTLE PLACES

HILMOR BENDS

with equal ease

- Lightweight bench model and portable benders for the plumber.
- Rotary hydraulic benders for gas and steam tube.
- Hand and power-operated general purpose and short radius mandrel benders.

HILMOR LTD.

(SALES AND SERVICE)

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Telephone : TERminus 4714
Telegrams:
"Tubenders" Phone London.

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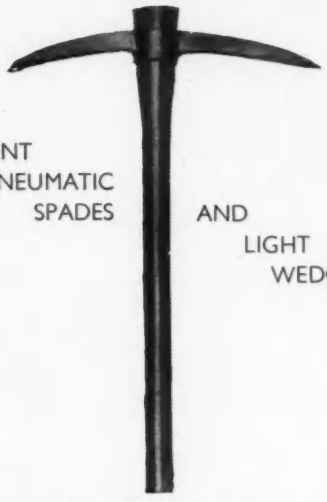

PATENT PNEUMATIC SPADES AND LIGHT WEDGES

MEIGH CASTINGS LTD.

UCKINGTON FOUNDRY
CHELTENHAM

TELEPHONE 54154

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JEAVONS

H.P. DISTRICT GOVERNORS

Photograph shows a duplicate set of 8" "Jeavons-Emco" High Pressure District Governors in brick built house.

Volumetric Governors and Holder Cut-off Valves also supplied.

★ DUPLICATE OR SINGLE SETS WITH BYE PASS. SUPPLIED IN SIZES 2" TO 12"—HIGH OR LOW PRESSURE.

JEAVONS ENGINEERING CO · TIPTON · STAFFS

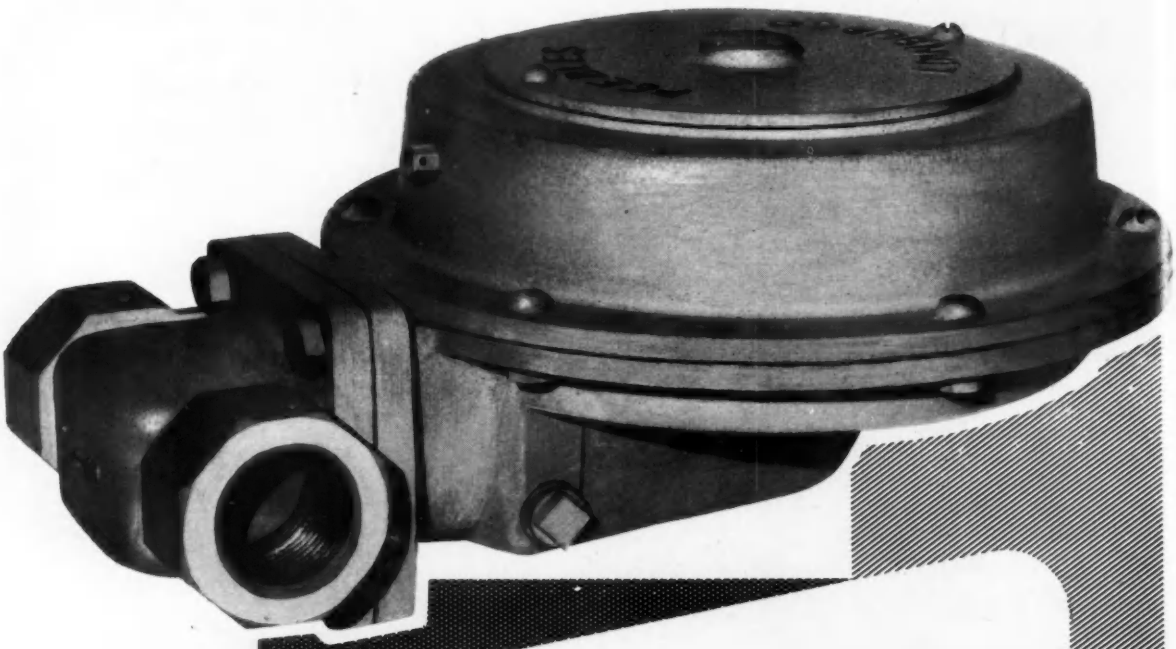
'PHONE: TIPTON 2161 (5 Lines). PROPS: E. E. JEAVONS & CO. LTD. 'GRAMS: PIPELINES : TIPTON

. . . . completely, rapidly, under the influence of ATLAS GREESKILLA.

This modern industrial detergent will cope with practically every degreasing job in engineering—ranging from plant *in situ* to machinery parts, gear wheels, bolts and nuts, etc. ATLAS GREESKILLA is a powder which readily dissolves in hot water. Although powerfully effective it is so mild that it will harm neither hands nor fabrics. Send now for descriptive literature of this truly economical degreaser.

ATLAS GREESKILLA
DEGREASER & CLEANSER

ATLAS PRESERVATIVE CO. LTD., ERITH, KENT. 'Phone: ERITH 2255 (3 lines) 'Grams: Deoxydizer, Erith
TAS/AS 113



The Figure 103

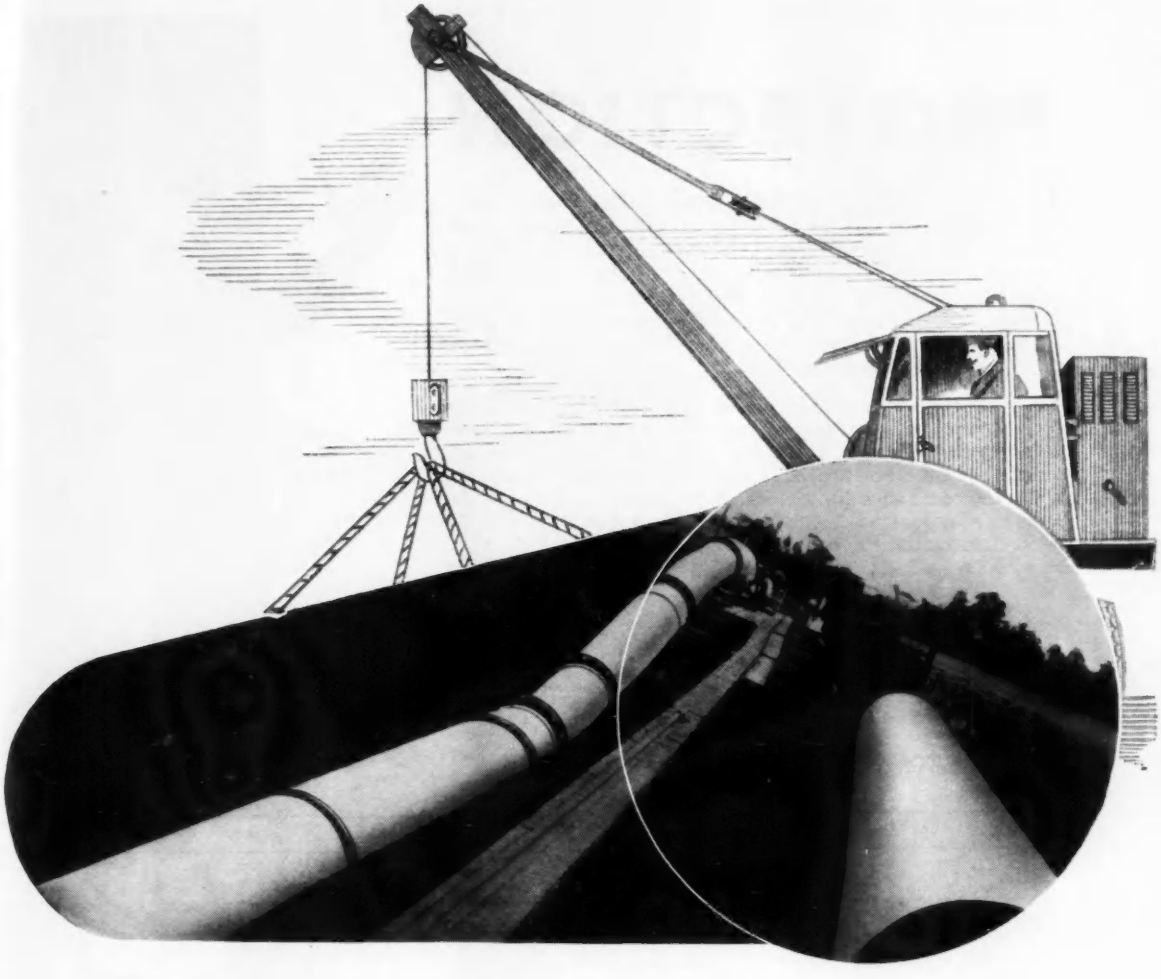
HIGH PRESSURE GOVERNOR

This governor may be arranged for gas flow in any direction, either horizontal or vertical, and it is suitable for inlet pressures up to 150 lbs. per square inch, with the outlet pressure in accordance with customers' requirements. Weight loading or spring loading may be employed according to pressure conditions.

Peebles
& CO. LTD.

TAY WORKS, WEST BOWLING GREEN STREET, EDINBURGH 6

Telephone : LEITH 36544 & 35069 Telegrams : "TANGENT, EDINBURGH"



Pipe Line Progress...

The strength and comparative lightness of the large diameter steel pipe coupled with its sectional length of twenty-five feet means faster laying, fewer joints and no breakage risks—practical and economical progress. Other equally important features of these pipes are illustrated in our Catalogue S.P. 40.

The **HORSELEY** *Group*

HORSELEY BRIDGE AND THOMAS PIGGOTT LTD., TIPTON, STAFFS.
CARTER-HORSELEY (ENGINEERS) LTD., WADDON, CROYDON, SURREY
AND ASSOCIATED COMPANIES.

PROTECTION

IN Chemical Works, Gas Works, Refrigerating plants, etc., the necessity for dealing with gas escapes and repair work calls for efficient protection of the men on the job. This is provided, in low concentrations of gas, by the "PURETHA" Respirator, which is comfortable, efficient and simple. Its canisters are coloured according to the gas or group of gases against which they give protection. Full mask and mouthpiece, nose-clip and goggles types.

For protection in confined spaces and high concentrations of gas, the company's well-known types of oxygen and compressed air self contained Breathing Apparatus are available. All other protective devices for the worker are also manufactured and supplied: Smoke helmets, short distance fresh air apparatus, resuscitating apparatus, dust masks, protective clothing, goggles, etc.

DIVING APPARATUS, BREATHING APPARATUS OF ALL TYPES, RESUSCITATING APPARATUS AND ALL INDUSTRIAL SAFETY APPLIANCES

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SIEBE, GORMAN & CO. LTD. LONDON

EVERYTHING FOR SAFETY EVERYWHERE

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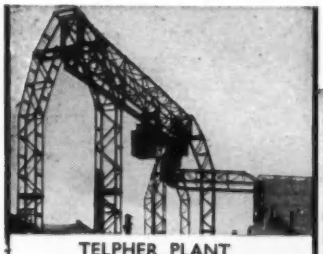
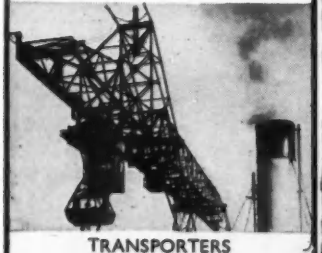


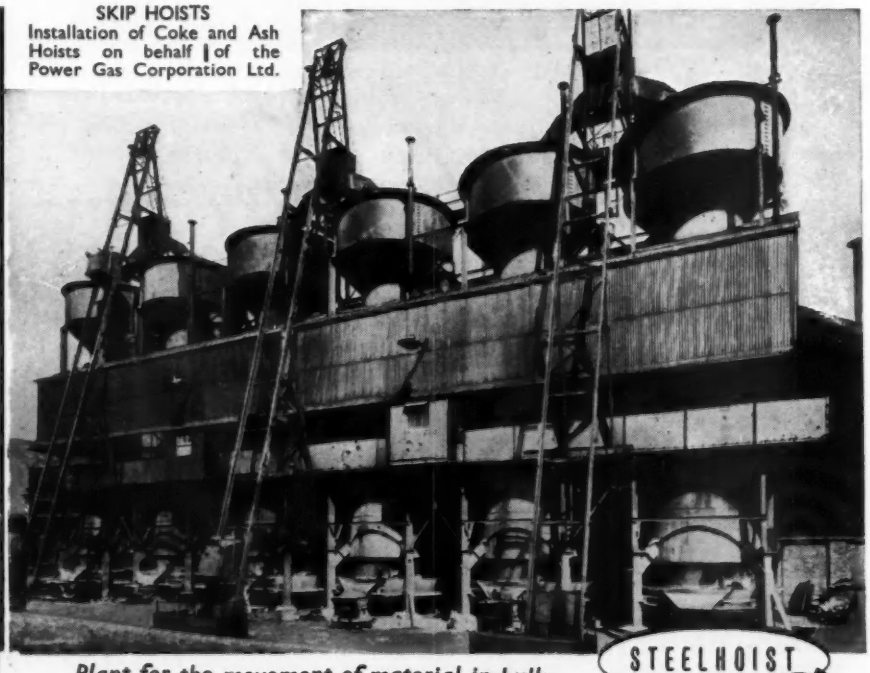
TELPHER PLANT



TRANSPORTERS

WAGON TIPPLERS

SKIP HOISTS
Installation of Coke and Ash Hoists on behalf of the Power Gas Corporation Ltd.



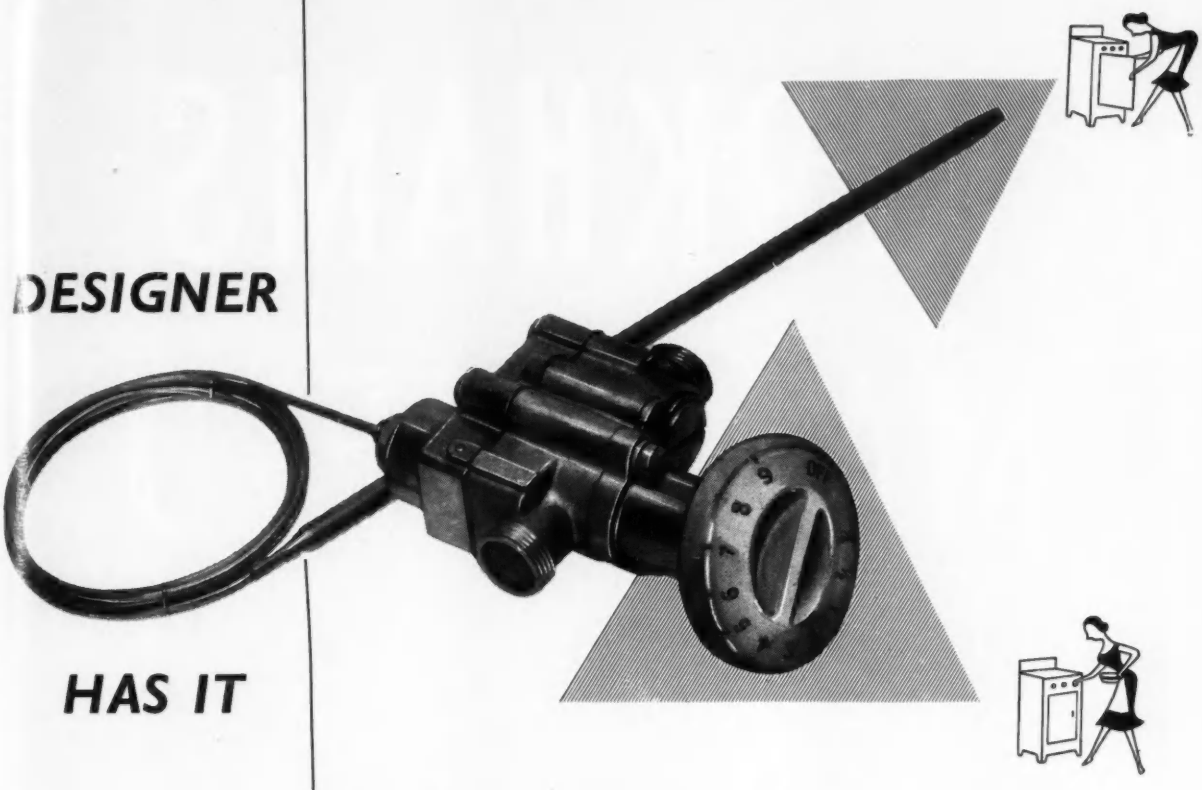
Plant for the movement of material in bulk.

STEELHOIST

STRACHAN & HENSHAW LTD

Steelhoist Works, Bristol 2. Tel: 77664.

DESIGNER



HAS IT

BOTH WAYS

With this Teddington capillary type thermostatic control the designer has complete freedom to place the element where it will respond best to variations in temperature, and the main body of the instrument where it will look best and is most conveniently got at. This Teddington control, available with or without oven cock incorporated in the one compact unit, is in use in De La Rue, Raymond, and Cannon cookers. Write for full details.

Teddington

CAPILLARY TYPE
GAS COOKER THERMOSTAT

THE BRITISH THERMOSTAT COMPANY LIMITED
THE LARGEST PRODUCERS OF AUTOMATIC CONTROLS IN EUROPE
Sunbury-on-Thames, Middlesex. Sunbury-on-Thames 456.

KIRKHAMS of MANSFIELD

invite your enquiries for

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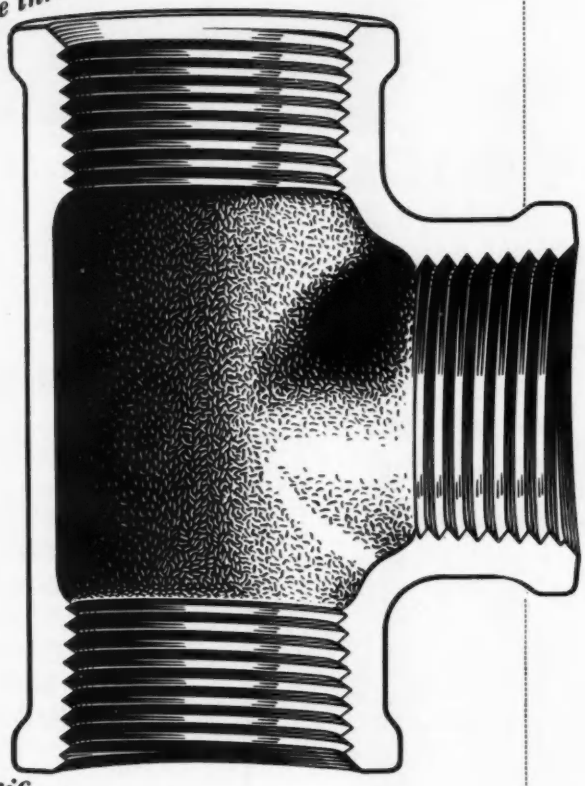
It's the threads that count



specify TAPER THREADS *for stronger joints*

Malleable Iron Pipe Fittings

As the largest producers in Great Britain of Malleable Iron Pipe Fittings, Crane call your attention to some special virtues. These fittings are of the banded pattern. They have taper threads. They are made to British Standard dimensions, and are individually tested. Finishes are in black and galvanised. Plain pattern fittings are also available.

CRANE VALVES AND FITTINGS

CRANE LTD., 45-51 LEMAN STREET, LONDON, E.1
Works: IPSWICH

Branches: BIRMINGHAM, BRENTFORD, BRISTOL, GLASGOW, MANCHESTER

HIGH GRADE SLOT AND ORDINARY METERS

I.G.E. AND HIGH CAPACITY LISTS

Nothing but the best materials and workmanship used in their manufacture

R. LAIDLAW & SON (Edin.) Ltd.
SIMON SQUARE WORKS, EDINBURGH
8/9, LUDGATE SQUARE, LONDON, E.C.4

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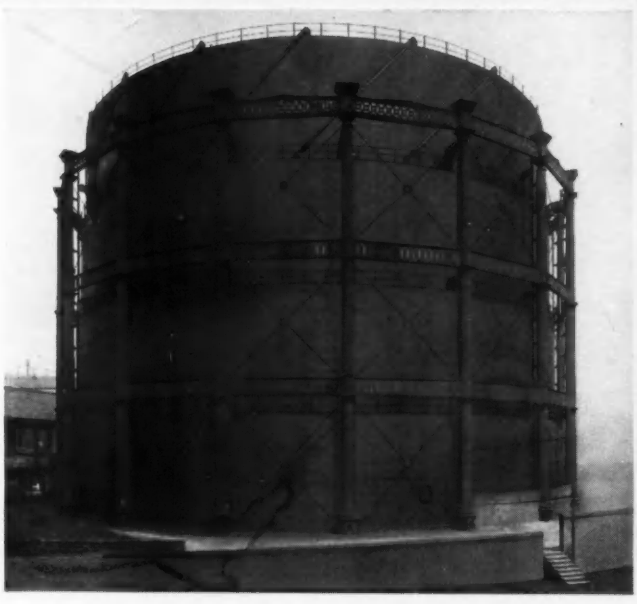

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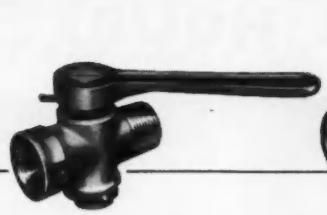
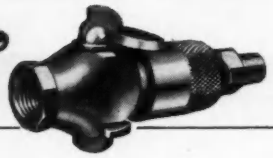


M & F Main Cock with Iron Key.



"Simflex" Drop Lever Cock with plug in Connector

9044 SE Plug in Cock and Connector (Rubber Sleeve Joint)

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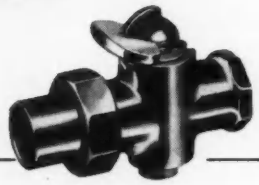
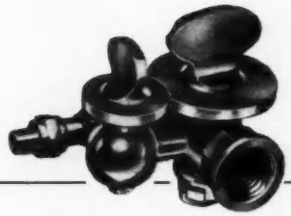


Union Cock with drop lever.

Gas Fire Cock with loose key, flanged for floor fixing.



Main and Bye-pass Interlocking Cock, for use on large-scale Catering equipment.

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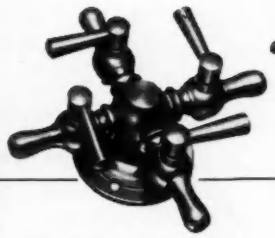
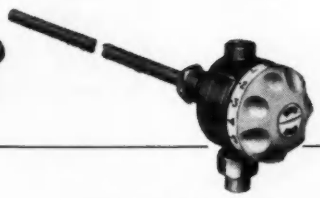


4 Way Laboratory Bench Cock, for Laboratory use.



Cooker Thermostat White plastic head with figures marked in black.

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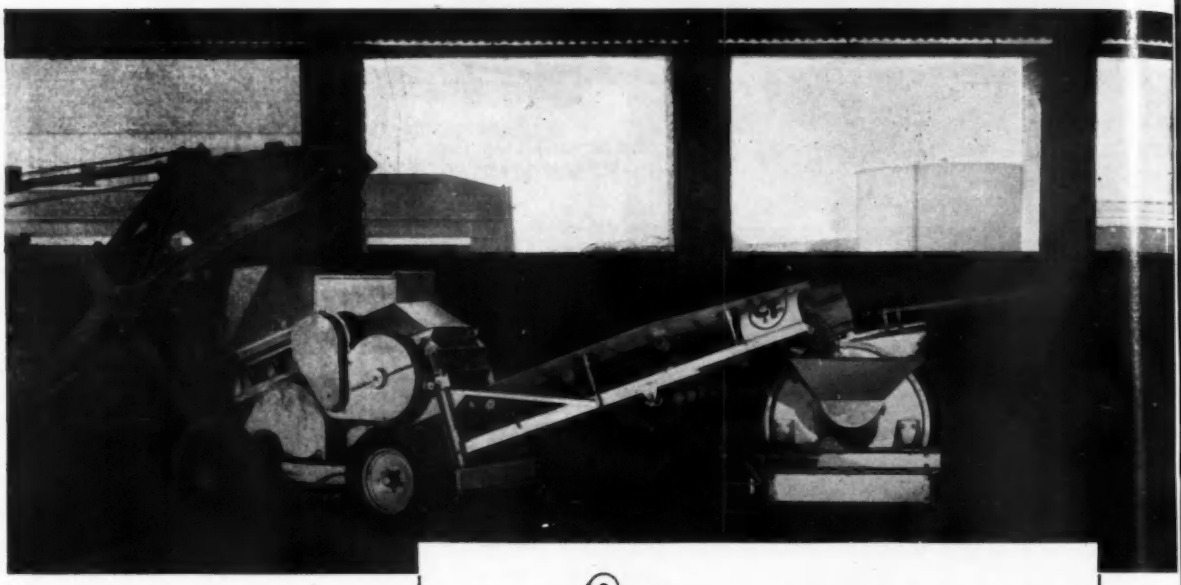

WITH C&T MOBILE EQUIPMENT

FROM 18" CUBE DOWN. The illustration shows C. & T. Mobile Equipment receiving from a mobile shovel oxide in very hard lumps up to 18" cube, and reducing it down to 80% minus $\frac{1}{8}$" size.

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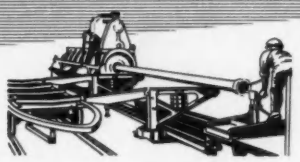

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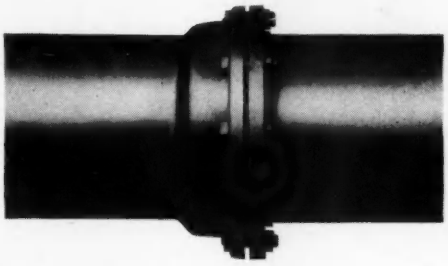

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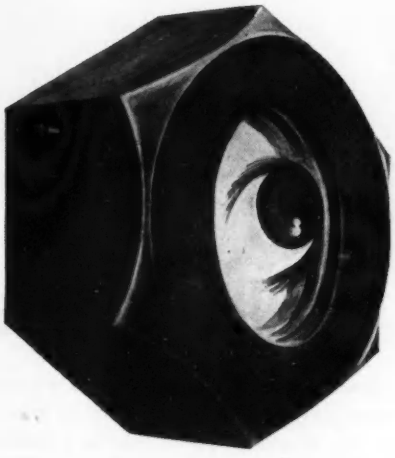

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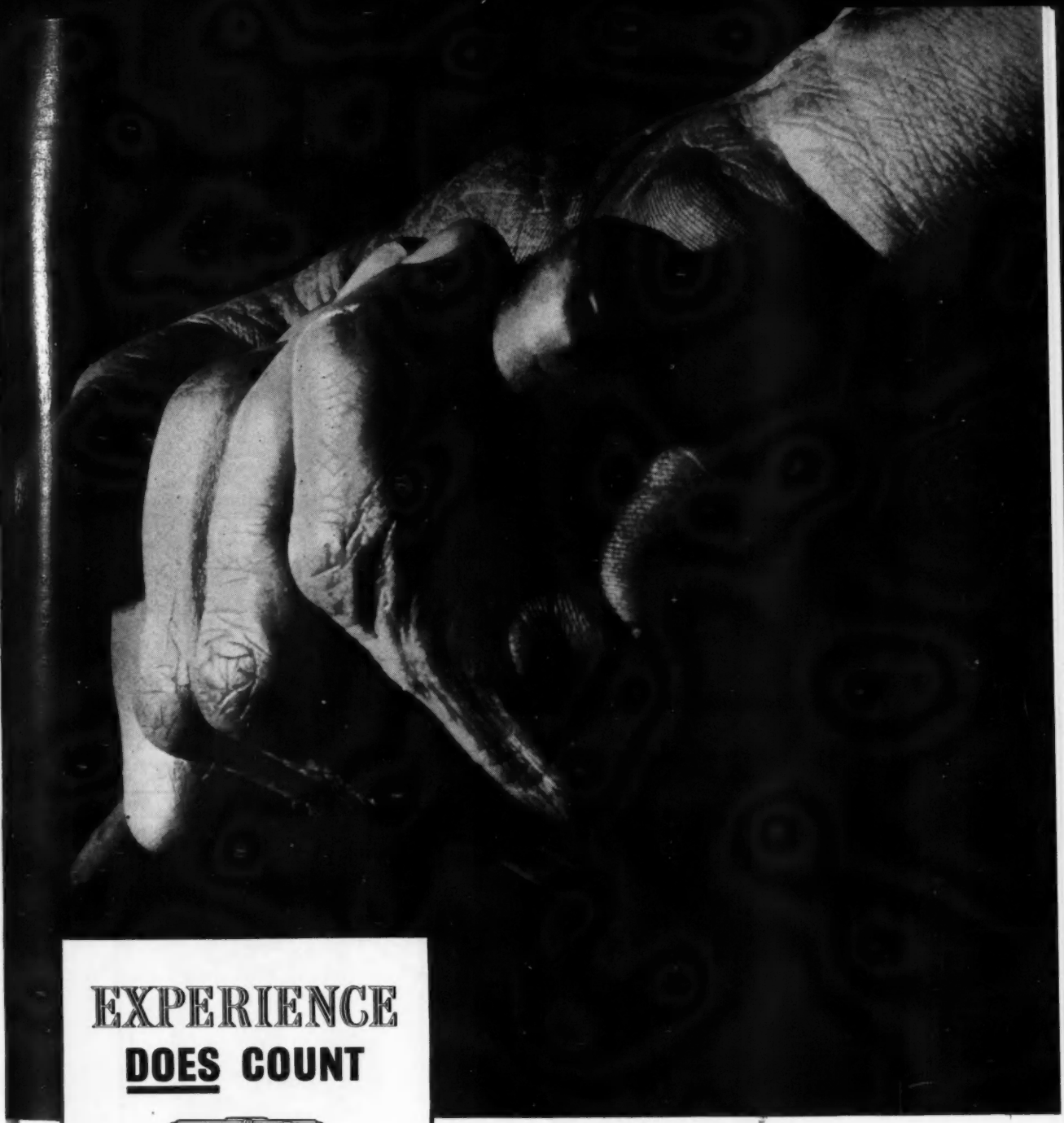

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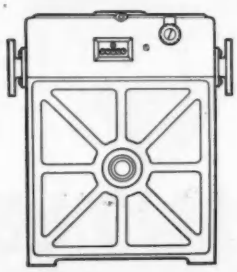

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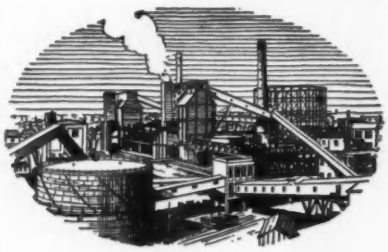

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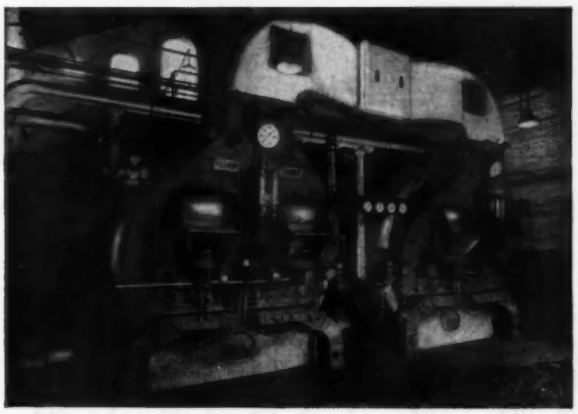

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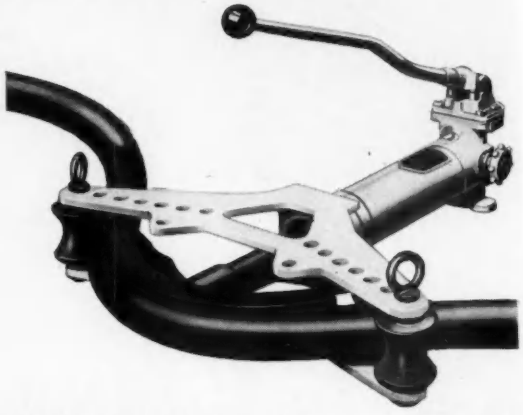

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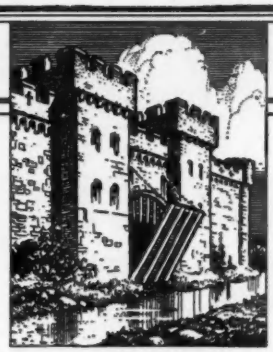

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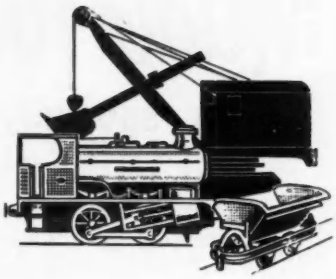

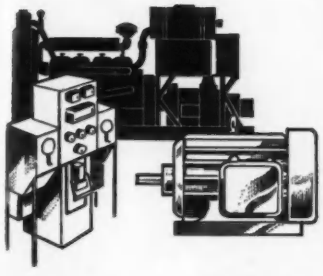

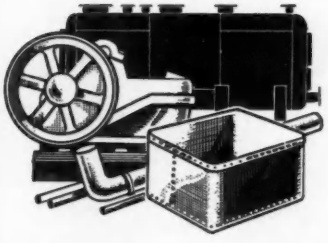

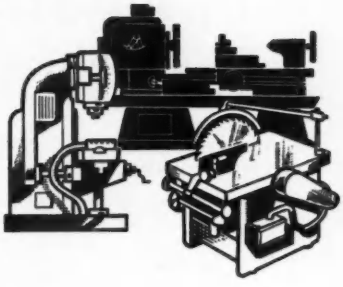

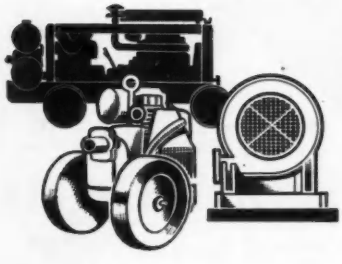

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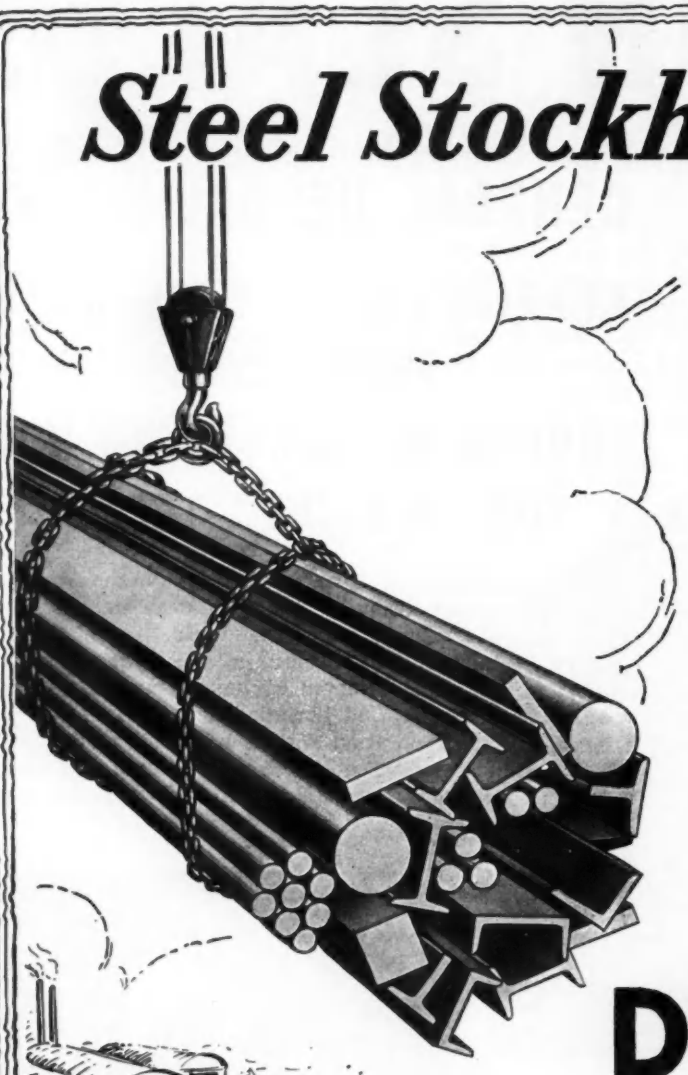

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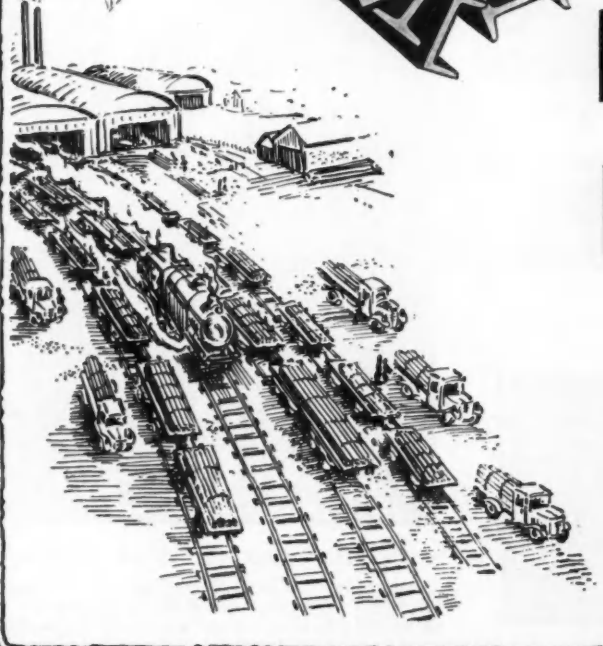

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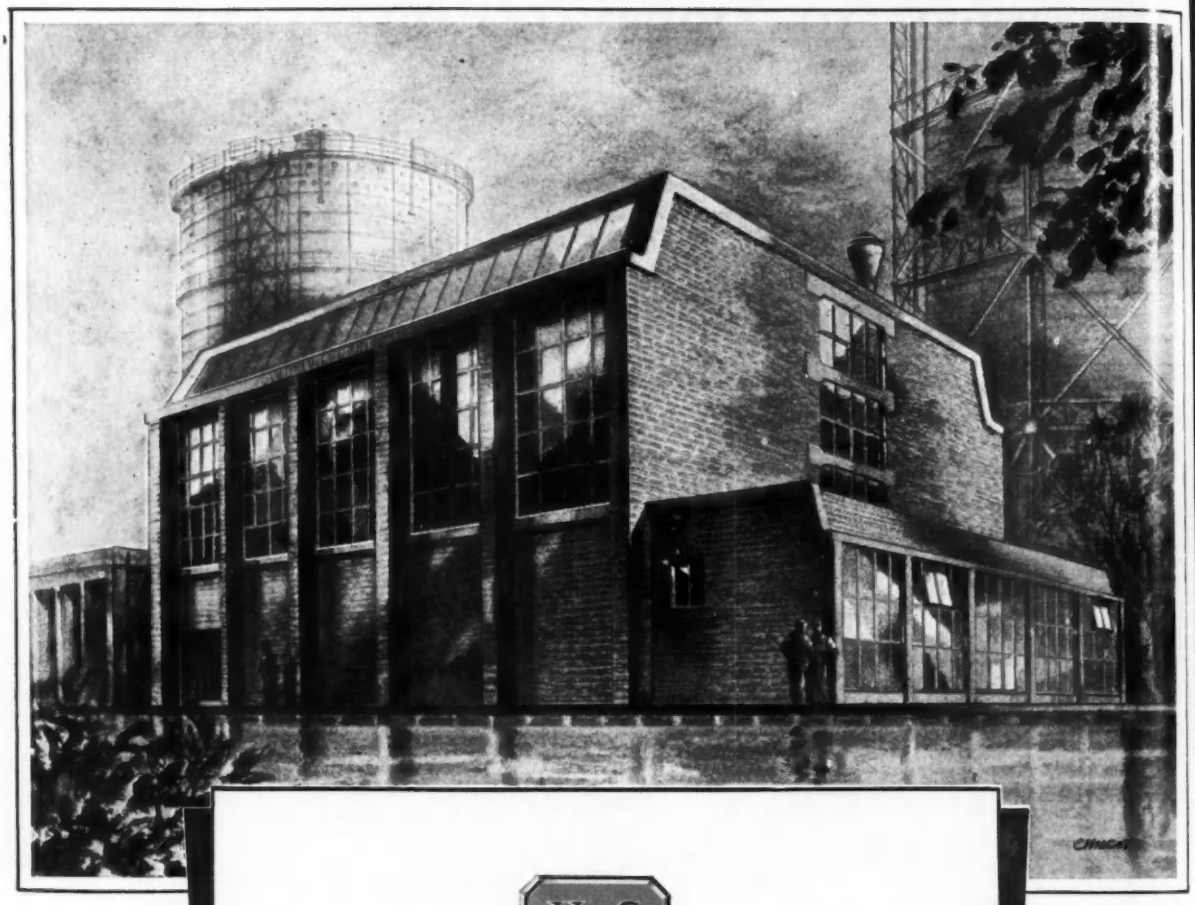

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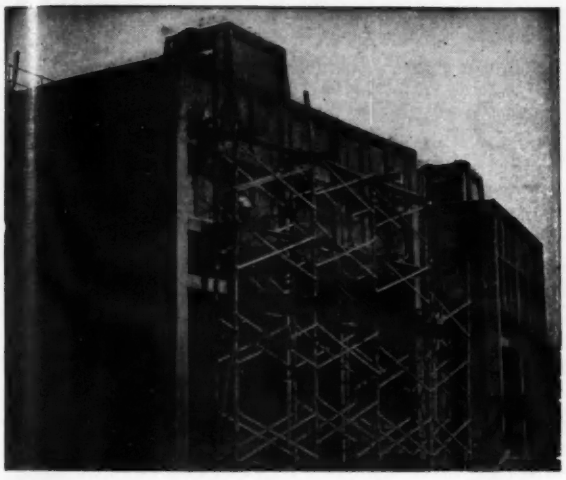

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Gas Journal

VOL. 277. No. 4728 106TH YEAR January 13, 1954

GASIFICATION OF WEAKLY-CAKING COALS

Extension in the range of coals for gas-making is of supreme importance in the future development of the gas industry. This was stressed at the research meeting of the Institution of Gas Engineers, when mention was made of the low-pressure gasification of non-caking or weakly-caking coals now being carried out in France and elsewhere with such systems as Gas Integrale. These systems are known to be capable of further technical improvements to advance their overall efficiency. Shortly after the Institution meeting ('GAS JOURNAL' of December 16, 1953) we published an article describing the G.I. system of complete gasification, for which the Woodall-Duckham Company holds exclusive rights in Great Britain. That type of plant operates on high volatile coals of low-caking properties. The production of coals falling into this category amounts to over 100 mill. tons per annum in the U.K. The majority are not at present suitable for treatment in existing forms of carbonising plant in this country.

On later pages of our issue today will be found a fully descriptive, illustrated article on a new gasworks. at Springs, on the Witwatersrand, South Africa. It is remarkable in that the New Era gasworks at Springs is believed to be unique. It is probably the first gasworks in the British Commonwealth where gas is produced exclusively by gasifying coal in water gas generators. The story carries great topical interest. Two major factors operated in the decision taken regarding the erection of these works. The first was that, initially at any rate, the demand for gas would be entirely for industry and that the fluctuating nature of this industrial load would render uneconomic the installation of carbonising plant. The second major factor militating against the use of carbonising plant was the growing shortage of good quality carbonising coal. On the other hand there was abundance of weakly-caking coal suitable for gas-making at low pressure. Following full investigation the Power-Gas Corporation, Ltd., and its subsidiary company in Johannesburg, Ashmore, Benson, Pease & Co. (Africa), Pty., Ltd., were entrusted with what amounted to a new gasworks. As explained in our article, the contract covered two units of carburetted water gas plant, each of a capacity of 1 mill. cu.ft. a day, and ancillary plant capable of coping with the combined output, though at present one gasification unit meets demand. There are several interesting features of this gasworks which we need not reiterate here; they will certainly arouse the interest of all gas engineers. We might mention, however, two points brought out in the article. The first is that, when installing water gas plants to work on coal it is necessary to bear in mind that the output of a generator when using coal is only 70%-80% of the output of plant of similar size using graded coke, and that special attention has to be paid to the means for dealing properly with the relatively large amounts of tar which are found when coal is gasified. The second is that care has to be taken in both design and operation to ensure efficient combustion of the blow gas from the generator to avoid the presence of smoke in the waste gas at the stack.

Since the plant went to work its output has in fact exceeded the rated output even when using coal of inferior grading. Operating results are set out in the article. No reference is made to the economics of the process. We have no doubt that our readers will join us in this regard in asking the Power-Gas Corporation to supplement the information given on later pages.

SELLING IN PERSPECTIVE

Despite the existence in this country of some 40 salesmen's circles, it cannot be said that their deliberations contribute in any large degree to the knowledge of markets and selling principles, whatever their value as a medium for the exchange of views and the creation of team spirit. Few have the courage or the foresight to invite the views of those outside the circle itself whose opinions may be based on wider experience or on the study of the sales problem from a different angle. We therefore applaud the action of the West Midlands Gas Sales and Service Association in inviting Mr. J. H. Dyde to address its members. Before his appointment as Deputy Chairman of the Eastern Gas Board—and we are now thinking in terms of 1929—Mr. Dyde was himself very closely associated with the selling of gas on the district. Ever since his first professional appointment at Plymouth, Mr. Dyde has taken a keen interest in the education and training of the salesman. He is in fact Chairman of the Sales Training Committee of the Institution of Gas Engineers, of which he is Past-President. Now the average sales representative is often unable to see the wood for the trees. Mr. Dyde, from the eminence of the Abbey Garden, is able periscopically to see over the tops of the trees and can thus gauge

sales efforts in relation to their surroundings. His paper from which we propose to select certain portions for comment, was thoughtful and well-balanced. We have no doubt that his audience found it of great value.

Since 1938 the average price realised per therm of gas sold has risen by about 75%, compared with a corresponding rise in the average price realised per unit of electricity of 25%, the difference between them being largely due to the influence of the cost of coal in the price structure of the two fuels. Domestic coal prices in the London area have in the same period increased by about 150%, a figure roughly shared by coke and oil. At present some gas business is being lost to oil as a result of greater freedom of oil supplies. We should not be disheartened by the loss of certain loads which we were lucky to get in the first place, suggests Mr. Dyde; rather we should concentrate our efforts on applications where gas has its peculiar advantages. Tariff structure and improvements in appliance efficiencies also have an important bearing on the competitive position. In general the electricity industry has made better use of tariffs as an incentive to promotional selling. On the other hand, improvements in appliance efficiencies have been most marked in the case of solid fuel and gas appliances.

In addition to the current trend to increased personal expenditure, there are taking place changes in the pattern of personal expenditure whereby the greatest proportional increase is in spending on household goods. Statistics of production are a fair index to sales, though they react slower with manufacturers' stockbuilding. Figures relating to production of cookers, wash boilers, and water heaters disclose some interesting points. Cookers were not subject to the Hire Purchase and Credit Sales (Control) Order, 1952, and the figures for gas and electric cookers show expansion to 1951 with a recession in 1952 continued into the early months of 1953, followed by steady recovery. The recession was more marked in the case of electric cooker production, but the rate of recovery is on a par with that of the gas cooker. The amazing effect on production of gas and electric water heaters of the Hire Purchase Control Order, operative on February 1, 1952, but rescinded in respect of water heating appliances on August 21, 1953, is clearly indicated.

The difference between a buyer's market and a seller's market is marginal. Our market is perhaps not so sensitive as most, but the lifting of the Hire Purchase Control Order entirely, and alleviation in purchase tax, would tend to reverse the trend towards a buyer's market. More purchasing power is spread over a greater number of people and there appears to be a greater market potential for the sort of household goods the gas industry has to offer, particularly those of high quality. According to the Eastern Gas Board's 'seasoned' salesmen, it is still easier to sell than it was in the middle 'thirties. Cookers, they say, given the right sort of presentation, are as ready a sale as ever they were. They confirm that the market is extremely sensitive to price changes; but it is anticipated that water heater sales will rapidly recover, though further reduction in purchase tax is needed to produce sales at all comparable with pre-war figures. The need is there, and a live sales policy could give the expansionist selling we all want to see. A similar position can be envisaged with refrigerators and space heaters.

With more women at work in the factories and a corresponding scarcity of domestic assistance, a premium has been placed on labour-saving devices, of which the gas industry has so many to offer and could, under more favourable conditions, offer still more. Although we have to sell against the counter attractions of a wide range of other household goods—television sets, radiograms, and many electrically-powered devices—we can not only hold our own but improve our position in the household expenditure budget. The experience of the Eastern Gas Board is that the psychological effect upon a family in full employment of the purchase of a television set—a purchase of such magnitude never having been negotiated before—has prepared the ground for the sale of a refrigerator involving a similar expenditure. Provided the productive capacity of British industry is maintained, there are strong indications that an expansionist market is awaiting us in the domestic field, and that it will provide us with an opportunity of correcting, and indeed reversing, the unhappy trend in the sales of gas per domestic consumer which have fallen from a peak of 127.4 therms sold per domestic consumer in 1947 to 118.6 in the year 1952-53. Such a change will not be accomplished without good salesmanship backed by sound sales management and organisation.

BACK TO A BUYER'S MARKET

In suggesting how best to move further from selective to expansionist selling, or what may soon become a buyer's market, Mr. Dyde quotes from the *Financial Times:* 'Gas is essentially a hearth and home service. Of the 12.3 mill. consumers registered up to the end of the year, as many as 11.5 were domestic. With this overwhelming fact, it is obvious where the gas industry must continue to concentrate its development projects.' Mr. Dyde is at variance with others' views in this regard. It is not a question of number of consumers. It is a matter of the proportion of the domestic and industrial loads and their potentialities—*vide*, particularly, the prospects of the West Midlands and the North Western Gas Boards. However, as far as the Eastern area goes (and we presume that this is Mr. Dyde's personal conviction), there should be concentration on the domestic market.

Mr. Dyde advocates uniformity in selling prices and fixing charges (so, of course, do most other people—in theory), and use of approved dealers. He has clear-cut ideas on simple hire and hire purchase. Long term hire purchase is virtually simple hire with its advantage of lowering sales resistance, but he would prefer to rely on militant salesmanship to ensure the turn-over of capital invested in sales within a reasonable period; certainly not more than five years. A uniform down-payment on a hire purchase 'sale'—say, £1 for all domestic cookers—is a useful incentive to buy, tending to swing a sale in favour of the better quality appliance. Mr. Dyde is in favour of facilities for paying hire purchase instalments on a weekly basis as, for example, by the purchase of stamps, thus giving the consumer a continuous record of his payment and outstanding balance.

We must, Mr. Dyde maintains, be careful not to err on the side of over-standardisation of our appliances for the sole purpose of reducing stocks carried and simplifying maintenance procedure. This would limit the range and choice of goods to customer. It should be possible to make regular changes in the 'dress' or external

appearance of appliances without changing the combustion and other technical equipment. American practice—though not necessarily wholly practical in our own country—is for constant changes to attract sales. There can be no doubt, however, that the less work that is done within the consumer premises, the better.

Sales campaigns provide a surge forward and give the sales staff a focus and common purpose to their activities. Of course, progress in the military sense is often most effective when attacks are delivered in short sharp bursts; ground won has a tonic effect on morale. We are pleased to note Mr. Dyde's warning against overselling on stock and delay in fixing—a not infrequent happening at the present time—and we endorse his approval of incentive bonuses and the encouragement of competition among sales staff. (Editorial comment on the vexed question of commission appeared in the January issue of 'GAS SERVICE'—inspired, incidentally, by a Circle meeting in the Eastern area.)

In regard to load building, replacement appliances, by virtue of their increased efficiency, show a saving in gas consumption for the same duty. The normal replacement of production plant and distribution systems at the greatly advanced prices of today demand a far greater revenue from gas if an economic position is to be maintained. If this is to be achieved without resort to increasing prices it means that more gas must be sold per consumer with little or no increase in costs beyond those attributed to production. The electricity industry maintains that domestic lighting, radio, television, and incidental power usage of their commodity are not sufficient to repay the inclusive costs of affording a supply. It is equally true of the gas industry to say that the cooker load alone will not support its economy and that it needs another major appliance, either water heater or refrigerator. In new properties where the effect of capital costs of supply is felt immediately, the securing of an adequate load is all the more important. Mr. Dyde rightly points out that a miscellany of small users such as gas pokers, gas igniters to solid fuel grates, and incidental space heating can in aggregate assist the position materially, and perhaps make all the difference between profit and loss, progress and disaster.

The West Midlands Gas Service and Sales Association was indeed fortunate in having such a clear picture of our sales problems presented to them. We wonder whether other sales groups in the industry will have the good sense to follow this example in some way or another. If they succeed in such an aim, they should—if we may borrow a phrase from the agony column—find something greatly to their advantage.

COUNTERING SMOKE FOG

Holborn Borough Council has accepted a plan which, it is contended, will counter smoke fog, and will forward it for the consideration of the Beavers Committee on air pollution set up by the Ministry of Housing and Local Government. The plan has for its main object the rapid organisation and distribution throughout the Borough of sealed, half-cwt. bags of smokeless fuel. It stated: 'The bag of fuel, being perfectly clean and dustless, could be readily stored within the ordinary house or flat with little or no inconvenience. The B.B.C. would broadcast within their existing organisation, as for gale warnings, a smog incidence warning, when all holders of the smokeless fuel bags would break the seal and use only this fuel until the "smog lift" is given by the B.B.C.' Such a plan obviously envisages honesty throughout the Borough.

PARENTS AND ADULTS FIRST

In the interests of their own safety adults should not be allowed into the National Schoolboys' Own Exhibition. Intending boy visitors should be warned that it is unfair and even dangerous to take their parents lest they be trampled to death or their illusions concerning the interests of the young be irrevocably damaged. There are, no doubt, parents who think of boyish interests in terms of trains, stamps and butterflies. Alas, they live in the past, in the period when 'ripping' and 'tophole' were the juvenile adjectives of delight. (Young parents probably recognise 'wizard' and 'smashing', but no parents, we feel, are truly conversant with the present day "supersonic' vocabulary.) When we visited the exhibition on January 4 conditions were hectic indeed. By the time the hundreds of boys in the gargantuan queue had reached their goal they had attained a high pitch of frustration, and having eaten their sandwiches and combed their pockets for the last fluffy sweet, were mad with hunger. Within the hall they fell like ravening wolves on the available tuck (we don't suppose they call it that now), and this refreshment constituted one of the major menaces to adults. Ice cream, candy floss and minerals make potent weapons in a madly jostling crowd. The muscular male stand attendants did their duty with ashen faces and glazed eyes, and the young ladies distributed Cydrax and literature with a deadpan efficiency that was a credit to their sex. (Where *do* they get these young women from—can they be Policewomen on special loan?) In the general melée we found the Gas Council stand doing good business with a pancake tossing competition for which the prizes were sticks of Mr. Therm rock prepared in gas-fired boilers. Our stay was necessarily brief. A particularly strong wave of youth detached us from the stand and whirled us cork-like down the gangway. As we were swept from the hall the candy floss level was rising and a handful of desperate parents seemed to be forming a human chain and fighting to avoid being submerged in the mulch of crisps, nuts, cartons and bottles. If this was youth having its fling, we were glad to be flung clear, suffering from nothing that a bottle of liniment and a good invisible mender could not put right.

R.S.A. PRIZES, 1954

THE Royal Society of Arts offers the following three prizes during the year 1954.

(i) Benjamin Shaw Prize for Industrial Safety.—The Benjamin Shaw Trust was founded in 1876 'for the promotion of improvements in all matters relating to unhealthy and dangerous occupations,' a subject in which the Royal Society of Arts has taken a practical interest ever since its foundation in 1754. A prize of £20 is offered in accordance with the terms of the Trust 'for any discovery, invention, or newly-devised method of obviating, or materially diminishing, any risk to life, limb or health, incidental to any industrial occupation, and not previously capable of being so obviated or diminished by any known and practically available means.' Entries may be in the form of descriptive essays or models.

(ii) Fothergill Prize for Fire Prevention or Fire-Fighting.—Under the Fothergill Trust (established in 1821) a prize of £20 is offered for a descriptive essay or model embodying some new idea for the prevention or suppression of fire.

(iii) Howard Prize for Mechanical Motive Power.—The Howard Trust was established in 1868 for the purpose of making awards periodically to the authors of treatises on steam or other motive agents, and a prize of £20 will be awarded to the author of a treatise on some aspect of the subject of mechanical motive power.

Entries for the foregoing prizes must be received by the Secretary of the Royal Society of Arts, 6, John Adam Street, Adelphi, London, W.C.2, not later than July 31, 1954.

Personal Notes

MR. B. A. LEWIS has been appointed Midlands Manager of Saml. Denison & Son, Ltd., who have opened an office at the White House, 111, New Street, Birmingham 2. T/N. Midlands 3931. T/A. Weigh, Birmingham.

MR. JAMES SCRIVENER, whose name has been long associated with Electrolux, Ltd., has been decorated by the King of Sweden with the Order of Vasa (First-Class), for his work in furthering Anglo-Swedish trade relations.

MR. L. W. H. REA, B.SC. (ENG.), who was recently appointed General Manager of Edwin Danks & Co. (Oldbury), Ltd., has now been elected to the Board, following the resignation of CAPTAIN (E) GREGSON, R.N.R. MR. W. SMITH, Works Manager, has also been elected a director, in place of MR. J. W. HARGREAVES, who has also resigned.

MR. W. ARNOLD HULME, well known in the gas industry through his association with R. & J. Dempster, Ltd., has been elected Deputy Chairman of the North Western region of the Engineering Industries Association, representing 500 firms, for a further term. Mr. Hulme was Works Manager with Dempsters but is now engaged in business on his own account, although continuing to represent Dempsters on the Association.

MR. ERNEST G. BROOKS has been appointed General Manager of the Gas Division of Thomas De La Rue & Co., Ltd. Mr. Brooks' long association with the gas industry began nearly 27 years ago with his apprenticeship with Thomas Potterton's, where he was privileged to gain considerable practical experience as the third generation of Brooks associated with that company. He acquired his technical training at the School of Building and Borough Polytechnic, is a City and Guilds Prizewinner, and an Associate Member of the Institution of Heating and Ventilating Engineers. Mr. Brooks was General Manager of Thomas Potterton (Heating Engineers), Ltd., under the joint Managing Directorship of the brothers T. F. C. and A. B. Potterton when the company joined forces with De La Rue. As General Works and Technical Manager, he has been responsible for some important technical developments in De La Rue's gas fired equipment during recent years and is known to many members of the gas and heating industries for his informal technical talks.

MR. BERNARD CLARKE, M.B.E., Divisional General Manager, Lincolnshire, has assumed functional control of the Lincoln group of undertakings (Lincoln, Horncastle, and Woodhall Spa). MR. C. A. BRAIN, Leicester and Northants. Divisional Accountant, has taken over the appointment of Divisional Accountant, Lincolnshire, and his offices are at divisional headquarters, Belle Vue House, Carline Road, Lincoln. MR. W. R. SMOUT, Lincolnshire Divisional Accountant, has taken over the appointment of Leicester and Northants. Divisional Accountant at divisional headquarters, Millstone Lane, Leicester.

MR. E. JOHNSON has been appointed Assistant Technical Officer at the headquarters of the East Midlands Gas Board. Mr. Johnson, chemical engineering assistant in the chief engineer's office, North Eastern Gas Board, since 1950, was educated at West Leeds High School and the University of Leeds. He was a Gas Research Fellow at the University of Leeds from 1948 to 1950, and a part time lecturer in metallurgy and building science at Bradford College of Technology.

MR. L. H. TUNE has been appointed by the National Council of the British Gas Staff Association to be the Midlands area organiser. This is an additional appointment due to the increasing work of the Association. Mr. Tune has been in the service of the Birmingham Gas Undertaking for 28 years and has been active in the social activities of the undertaking. He was Chairman of the Birmingham Staff Social Committee, and was one of the founders of the B.G.S.A. in Birmingham, and since the inception of the Branch there has been Secretary. Mr. Tune will be the Organiser of the West Midlands, East Midlands and North Eastern areas.

MR. A. L. LEE has retired after serving the Eastern Gas Board and the Colchester Gas Company for over 57 years, and to mark the occasion he has received a presentation from Mr. F. Allen, Manager of the Colchester Group. Mr. Lee joined the old Colchester undertaking in October, 1896, as a fitter's boy. After two years he graduated to service layer's mate and in 1899 to service layer. He continued in this capacity until 1943 when advancing years made it necessary for him to be engaged on lighter work. For two years he acted as van driver's assistant, and in 1945 he became showroom messenger, in which capacity he was engaged up to the date of his retirement. In his earlier days Mr. Lee was a keen gardener and a good shot. Boxing also claimed his interest. He served in the first world war with the Royal Engineers, being discharged in 1918 with the rank of acting sergeant. The presentation took the form of a cheque subscribed by his workmates and members of the Colchester staff.

Diary

Jan. 14.—MANCHESTER JUNIORS: Short Papers for the 'F. Johnstone' Prize.

Jan. 15.—SCOTTISH JUNIORS (WESTERN): 'Some Aspects of Consumer Service,' W. A. Green, Paisley.

Jan. 15.—LONDON JUNIORS: 'Gas to Crawley and other Distribution Problems in New Towns,' J. E. Steele, South Eastern Gas Board.

Jan. 18.—EASTERN G.C.C.: Connaught Rooms, Great Queen Street, Kingsway, W.C.2, 2 p.m.

Jan. 19.—LONDON AND SOUTHERN SECTION, I.G.E.: 'Steam and Power at Bow Common,' A. F. Grant, North Thames Gas Board.

Jan. 20.—YORKSHIRE JUNIORS: 'Review of Town Gas Production,' A. F. Cottrell and T. W. Austen, Woodall-Duckham Construction Co., Ltd. At Bridge Street, Leeds.

Jan. 23.—WESTERN JUNIORS: Visit to Taunton gasworks. Papers by student members.

Jan. 20-29.—HOTEL RESTAURANT AND CATERING EXHIBITION, Olympia.' Gas Council Exhibit.

Jan. 27.—EASTERN JUNIORS: 'Distribution Problems,' R. O. Emmony, at Hitchin.

Jan. 28.—MIDLAND JUNIORS: Visit to Parkinson Stove Co., Ltd.

Jan. 28.—NORTH THAMES G.C.C.: Westminster City Hall, Charing Cross Road, 2.30 p.m.

Jan. 28.—INSTITUTE OF FUEL: 'The Coal Problem,' D. Hicks. Gas Showrooms, Nottingham, 6.15 p.m.

Jan. 29.—SCOTTISH JUNIORS (WESTERN): Annual Dance and Buffet. The Ca'doro, Union Street, Glasgow. 7.30 p.m.

Jan. 30.—MANCHESTER JUNIORS: Visit to Blackburn Greenbank Gasworks. 'The Design and Performance of 0.5 mill. cu.ft./day Tully Carburetted Complete Gasification Plant.' G. R. Spence and G. Wheatman, Kendal Group.

Feb. 1.—WEST MIDLANDS G.C.C.: Queen's Hotel, New Street Station, Birmingham. 2.15 p.m.

Feb. 2.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, 10.45 a.m.

Feb. 4.—LONDON JUNIORS: Visit to Telcon works.

Feb. 6.—SCOTTISH JUNIORS (EASTERN): 'Maintenance of Mechanical Plant.' G. A. Wood, Edinburgh.

Feb. 6.—YORKSHIRE JUNIORS: 'Accounting at Group Level,' K. L. Pickthall, Group Accountant, Huddersfield/Halifax Group, North Eastern Gas Board. At Harrogate.

Feb. 9.—WALES AND MON. JUNIORS: Short Papers by students J. R. Fisher, J. Sargent, D. Thomas and G. Griffiths. Swansea.

Feb. 9.—MIDLAND JUNIORS: 'Controls and their Application.' W. Bevan-Lewis, Sperryn & Co.

In 'The Year's Obituary' in our Annual Review Number of December 30 we incorrectly referred to the late Mr. H. Barlow as a Director of Smith Meters. He was in fact on the board of Meters, Ltd.

Ammoniacal Liquor as a Fertiliser

By Dr. ARTHUR MARSDEN, M.B.E., F.R.I.C., M.I.Chem.E., F.Inst.F.
Area Scientist, South Western Gas Board.

The race between food production and increase in population is perhaps the world's biggest problem today, so that the economic use of fertilisers to the utmost is a vital necessity. If sufficient food is to be produced from the soil it is helpful to correct continually the natural tendency of the land to become acid, because that condition conflicts with our requirements. Some comfort is afforded by the fact that there are 18 mill. acres of grassland in Britain and they hold immense possibilities for our people if properly managed. As a result of the large amount of work carried out on plant nutrition, it is now generally recognised that plants require a balanced diet including various chemical elements, chief among which are nitrogen, phosphate, potash, and lime.

Most farmers are well acquainted with the value of nitrogen top-dressing for backward crops, and any shortage of nitrogen has far-reaching effects because not only is the yield reduced but the feeding value of the crop is reduced owing to its lower protein content. As mentioned later, various nitrogenous fertilisers are available, but the use of crude ammoniacal liquor as a fertiliser may be profitably examined from several points of view, all of which are of national importance. Without attempting to place them in order of importance, the chief ones are:—

(a) The provision of a nitrogenous fertiliser, at a reasonable price to the farmer, which avoids the use of a sulphate radicle, thus tending to reduce soil acidity and leading indirectly to further financial savings, as, for example, in conserving valuable sulphuric acid.

(b) The use of a valuable by-product from the coal carbonising industry which, although of considerable financial benefit to the gas industry years ago, has become in many cases an additional charge on the gas-making process.

It is the object of this article to examine in some detail the use of this potentially valuable nitrogenous fertiliser and to show how it may supplement the use of other fertilisers and, at the same time, assist in mitigating the sulphur shortage and help to solve the problem of stream and river pollution.

A considerable amount of research has been carried out in this country on the treatment and disposal of gas liquor, particularly by Research Committees of the Institution of Gas Engineers and the Institute of Sewage Purification. According to Southgate, considerable work has also been undertaken in Germany.

It has been suggested that crude ammoniacal liquor could be used more conveniently for composting straw to yield a product similar to farmyard manure, but it would appear that, although of possible use to individual farmers, the idea has little application when viewed nationally. An important factor would be the extent to which any toxic constituents are decomposed during composting.

Proposals have also been made for using by-product ammonia for the preparation of a dual purpose fertiliser such as ammonium phosphate. While such substances have an effect equal to that of mixtures of simple fertilisers containing the same quantity of plant food, the effluent problem would remain so far as the coal carbonising industries are concerned.

Recently the use of ammonia, liquefied by compression, has expanded in the U.S.A. at the expense of ammonium salts. (See *Agriculture* No. 6, September, 1953, p. 275.)

The Fertiliser Position in Great Britain

It is common knowledge that fertiliser requirements in any given district depend on a number of factors, important among them being the nature of the crops being grown, the type of soil, and the climate. However, the important substances nitrogen, potash, phosphorus, and lime, required in varying proportions under different conditions, may be obtained from a number of sources, some of which, such as farmyard manure, also supply humus.

In this article attention is focused primarily on nitrogen, the principal sources of which, in the combined form, are sulphate, nitrate, and bicarbonate of ammonia, 'nitro-chalk,' Norwegian saltpetre, cyanamide, and Chile nitrate, to which may now be added liquid ammonia, concentrated ammonia liquor, and crude ammoniacal liquor. Crude ammoniacal liquor is the cheapest ammoniacal substance available in considerable quantity and its actual worth to the farmer depends primarily upon the relative costs of transport and its efficiency as a fertiliser compared with that of sulphate of ammonia.

Table 1 gives an idea of the proportions of nitrogenous fertilisers used in Great Britain.

TABLE 1

	Nitrogenous Fertilisers: Sulphate of Ammonia	Nitrogenous Fertilisers: Other	Total (tons)
1950-51	683,723	292,959	976,682
1951-52	547,607	298,613	846,220
1952-53 (estimated) ..	620,000	441,000	1,061,000
Converted to Nitrogen			
1950-51	140,847	45,373	186,220
1951-52	112,807	46,275	159,082
1952-53 (estimated) ..	127,720	68,340	196,060

Before the first World War, Germany was the world's largest producer and consumer of by-product sulphate of ammonia and, in 1913, consumed 480,000 tons, only 20,000 tons of which were produced synthetically.

In 1920, the Nitrogen Products Committee urged the utmost economy in the recovery of by-product ammonia and, of course, until about that time it was profitable to process ammoniacal liquor, obtained by carbonising coal, for the production of sulphate of ammonia. However, with the manufacture of synthetic ammonia on a large scale, by-product ammonia processing has ceased to be profitable.

This is not the place to discuss the complicated reasons for the operation of a large synthetic ammonia industry, but that is no reason for wasting annually what is really a national asset —namely, ammoniacal liquor produced by the gas and coking industries to the extent of about 1,500 mill. gal., equivalent to, say, 400,000 tons of sulphate of ammonia—unless it can be shown that every economically possible way of utilising it has been exhaustively examined.

A considerable amount of energy is required to synthesise ammonia, the theoretical requirements being 1,673 B.Th.U. per lb. of liquid ammonia. If it is vital to export coal in order to earn money, then attempts should be made to save at least a portion of the coal used to provide the energy for ammonia synthesis.

If the coal saved could be exported there would result a profit to which should be added either the value of the sulphuric acid and the cost of converting the synthetic ammonia into

sulphate, or the appropriate charges for producing other fertilisers. This view of the situation receives additional support when it is remembered that only about 11½ mill. tons of coal were exported in 1951 compared with 52 mill. tons in 1937.

It is not suggested that it would be an economic or an advisable proposition to convert all the by-product ammonia into sulphate. Even if its market value were satisfactory, there are still many gas-making units too small to justify ammonia processing. However, most or all of such works are sufficiently near to cultivated land to warrant the transport and application of the crude liquor to the land if it can be shown that such liquor is a suitable and satisfactory fertiliser. This important aspect of the matter is dealt with later and attempts are made to compare the fertilising properties of the crude ammoniacal liquor with those of sulphate of ammonia.

The British gas industry carbonises approximately 27 mill. tons of coal per annum and produces an average of 35 gal. of crude ammoniacal liquor per ton—say 945 mill. gal. per annum, equivalent to approximately 240,000 tons of sulphate of ammonia.

Early Experiments

As long ago as 1923 reference was made in the 'GAS JOURNAL' (F. Clifton Sherriff, 'GAS JOURNAL,' 1952, **269,** 224) to the melancholy experience of the Yorkshire gas manager who tried during the latter part of the first World War to interest farmers in gas liquor. Due perhaps to the comparative scarcity of suitable equipment in those days, coupled with a not unnatural suspicion on the part of the farmers of a 'chemical' which may have been thought to have an injurious effect on plant life, no-one availed himself of the offer.

If ammoniacal liquor could be used satisfactorily as a fertiliser it would simplify two problems—first, the disposal problem from smaller gasworks where the quantities of liquor are insufficient to justify the erection and maintenance of a concentration or sulphate plant; secondly, the need for use of sulphuric acid for the neutralisation of the ammonia.

The former Tottenham Gas Company sponsored trials with ammoniacal liquor some 18 years ago on market garden crops, potatoes, and grassland, and trials were run on light sandy loam and moderately heavy clay. In addition, comparisons of yield and quality were made on crops from plots receiving:—

(a) Complete artificial fertiliser.
(b) Complete artificial but with ammonia liquor replacing the other sources of nitrogen.
(c) Dung and a smaller quantity of artificials.
(d) Dung and a smaller quantity of artificials but with ammonia liquor replacing the other sources of nitrogen.

Unmanured plots were used as controls.

Early Criticisms

The results showed that liquor could be used as a fertiliser if certain precautions were observed but that its use had certain disadvantages. For example, it was pointed out that the cost of transport of the liquor would be uneconomic in many cases.

In addition, apart from cabbage and grass, the liquor had adverse effect on plants used in the tests. It was also stated that the land became sour and required a fairly heavy dose of lime to sweeten it. These effects on plants have not been borne out by more recent trials. It was finally concluded that, although crude ammonia liquor could be used as a nitrogenous fertiliser, the cost of transport, together with the practical difficulties of application, made its use impossible except on a small scale or in specially favourable circumstances.

Neilson, a market gardener, who collaborated with the Danish Gas Company, reported that damage would be done to tomatoes and chrysanthemums in greenhouses, but he claimed to have used ammoniacal liquor successfully over a period of years on ground cropped with cabbages, potatoes, beetroot, turnips, carrots, and asparagus. He stated that planting should be carried out in about three weeks, and the sowing of the seeds about eight days, after the last application of liquor. The benefits of manuring in this way were assumed to last over the winter, little ammonia apparently being lost by leaching.

Work undertaken in Germany during the war has been reported by Bell in B.I.O.S. Report 873. Experiments carried out by the Agricultural Research Department at Verden, in which gas liquor was compared with Leuna saltpetre, presumably at similar nitrogen levels, gave the following yields from similar sized plots of grass:—

Without manure	9.2 cwt.
With saltpetre	12.7 cwt.
With gas liquor	13.5 cwt.

Recent Work

There was undoubtedly much more early work carried out than that to which reference has already been made, but much of it was sporadic and unco-ordinated. It must also be remembered that, although much remains to be done, our knowledge of the complicated reactions taking place in the soil relating to plant nutrition has increased rapidly in recent times.

In any discussion of the subject there are several vital factors to be borne in mind if failure is to be avoided. The liquor must, of course, be entirely free from tar and oily matter and must be correctly applied. Care must be taken to maintain a correct balance of the essential fertilisers so that it is necessary to maintain adequate supplies of phosphate, potash, and lime in the soil, just as is the case when any other nitrogenous fertiliser is used. The danger lies not in excessive nitrogen as much as in 'unbalanced' nitrogen. The continued use of sulphate of ammonia may bring about a loss of calcium by base-exchange, thus tending to cause acidity in the soil; but any such loss brought about by gas liquor is likely to be comparatively slight because much of the ammonia is not combined with anions that produce stable calcium salts. In cases of soils containing naturally large amounts of lime, such a loss may be of little consequence. In others the cost of replacing the lime should be counted in favour of the use of liquor.

There is also the much-debated question of the possible effect of the constituents of ammoniacal liquor, other than ammonia, on plants and vegetation. Work has been in hand for some time to settle this problem and so far the results are very favourable. In the early days much was made of the possible detrimental effect on soil or plants of certain constituents of liquor, but wide experience to date has shown that soils and grass are not adversely affected. Information on arable crops is not sufficiently advanced to warrant a dogmatic opinion.

It was felt, however, that such work, and also the comparison of the fertilising effects of liquor compared with other nitrogenous fertilisers, was of a long-term nature. Tests over one season are of little use in such problems. Therefore, while these are being continued, it would be helpful to link them with large-scale applications which, in themselves, would be complementary. A number of field experiments have been carried out near Bristol, while Ministry of Agriculture advisory chemists all over the country have been busy on field trials with grass, kale, and cereals. It is hoped that results will be available in the near future.

It was in this way, through the co-operation of farmers possessing the pioneering spirit, that what may be called recent work was undertaken. An excellent example of this was the trial carried out by Mr. Sumpter, of Brigg, Lincs. Some of his work has already been described in the literature (cf. *Farmers' Weekly*, May 26, 1950, and 'GAS JOURNAL,' 1952, **269,** 224-227), but some aspects are worth mention again. The writer, in company with Mr. Patterson, of the N.A.A.S., visited a farm which is run as a mixed farm and where a Friesian herd of about 30 milking cows is kept. Part of the success of this farm is attributable to the fact that the amount of phosphates and potash used has been increased

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Jersey	190
√ Kensal Green V	336
√ Lincoln IV	138
√ Penzance III	42
Rotherham	617
Smethwick III	205
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so that the extra nitrogen in the large quantity of gas liquor used per year on a 240-acre farm is balanced by more phosphate and potash. The farm is situated on Lower Lias limestone. Liquor has been applied to fields growing grass, sugar beet, oats, and wheat. The only signs of trouble seen in the crops were slight symptoms of manganese deficiency in the oats, and this could not be attributed to the use of ammoniacal liquor.

The method of application adopted on the arable land was to apply 300-400 gal. per acre after the crop was off and before ploughing, followed by a similar quantity in early spring after the seeds were through, with a further dressing if considered desirable. No detrimental effect on stock was noticed.

The next work of importance, and probably the best example of the use of ammoniacal liquor on a large scale in Great Britain, was that carried out in Hampshire by the Southern Gas Board. In the summer of 1950 a machine was

Fig. 1.—Application machine and tractor.

designed to apply liquor to farm land sufficiently rapidly and economically to provide a practical proposition to the farmer. After some initial troubles, test applications were made in July of that year with encouraging results, and in August, 1950, application was started on a large scale. Since that time much work has been carried out in conjunction with the Ministry of Agriculture. Nearly all the application has been on grassland, some 8,500 acres having been treated spread over 183 farms, the usual rate of application being about 400 gal. to the acre, equivalent to approximately 3 cwt. of sulphate of ammonia. A certain amount of scorching was noticed on the grass, but in the normal season this disappears rapidly. Improved growth with higher protein content commences in 10-12 days. Since most of the present gallonage sold consists of repeat orders from year to year it seems reasonable to claim that farmers themselves are satisfied with the results.

Comparative tests with sulphate of ammonia demonstrated that the ammoniacal liquor is not so subject to loss by leaching and is more persistent in its action. Simple liquor application machines and suitable tractors can be obtained (see Fig. 1). Two machines should be capable of handling about 20,000 gal. of liquor per day with a maximum capacity of 30,000 gal. per day on large jobs. It was found that the most difficult part of the work was the introduction of the service to the farmer, and—particularly in the early stages—of obtaining sufficient volume of work in an area to make it worth while. However, experience has shown that, by putting two or three representatives in an area at the same time, results can be obtained quickly.

Although the liquor is well known as a dilute fertiliser, it has been found to be an economic proposition to transport it as far as 20 miles from the gasworks. The liquor has been applied to arable land before planting, and root crops have been dressed during growth. In 1951 liquor was used on 29 farms in the Portsmouth area, about 700,000 gal. being applied to approximately 1,200 acres of arable land, leys, and permanent pasture. Experience has shown that a certain amount of scorching occurs on grass, but that it disappears quickly. The crop recovers, and thereafter the result on the growth is as good as, and at times superior to, that obtained with an equivalent nitrogen dressing in the form of sulphate of ammonia.

It is emphasised that the liquor should be applied to the soil rather than sprayed on to the leaves of the crop, since spraying leads to loss of ammonia in the air by evaporation and greater damage to leaf tissues by scorching.

Undoubtedly the work carried out in Hampshire during the last three or four years, during which time about 1¼ mill. gal. of liquor per year have been applied to farmland, has been most useful and important.

The area of the South Western Gas Board is particularly suitable for trials with fertilisers, and work has been carried out in conjunction with the National Agricultural Advisory Service of the Ministry of Agriculture for a number of years. In March of this year, with the co-operation of agricultural contractors and interested farmers, a scheme was launched for the use of ammoniacal liquor as a fertiliser. Between March and the end of September, 1953, about 660,000 gal. had been applied to 2,040 acres of grass, 106 acres of corn, and 45 acres of various crops, all with success. The trials carried out in conjunction with the N.A.A.S. have shown that for kale and cereals results are comparable with those obtained from sulphate of ammonia.

With grassland, very good results are obtained with old turf; and while in established leys broad-leaved clover appears to be retarded, other types are relatively unaffected.

Suggestions for the Future

When considering the possible use of ammoniacal liquor as a fertiliser it was realised in the early stages, as already mentioned, that long-term experiments are needed to settle the question whether continuous use on land alters the micro-biological flora sufficiently to allow the build-up of toxic materials to levels which might damage plants. Work in this connection has been in progress for some considerable time.

Farmers are busy people and would not be likely to take kindly to new complicated procedures. The obvious solution of the problem would seem to be close co-operation with agricultural contractors. They came into being over 100 years ago when a few enterprising people started contract ploughing with steam-driven ploughs, although it is a far cry from those early pioneers to the specialised contractors of today whose activities fall into four main groups:—

(1) General contractors who undertake ploughing, cultivating, combine harvesting, and pick-up baling.
(2) Lime and bulk fertiliser spreaders, who operate fleets of suitable machines.
(3) Land reclamation and draining, together with the provision of service equipment such as bull-dozers and excavators.
(4) Crop sprayers, who are specialists in the control of weeds and plant pests.

With the drift of labour from the land, more complicated and expensive machinery is constantly being evolved capable of doing the work of several men. This new machinery calls for a new class of agricultural workman who must be a mechanic as well as a farmer. Unskilled operation of these machines could result in damage to the machine, and to the loss of crops. A contractor serving 50 or 60 farmers requires much greater operating skill than a farmer who merely works his own farm. In addition to the high cost of purchase and maintenance of the machines, few farmers with less than 300 acres can afford to be fully mechanised without risking over-capitalisation, particularly when it is remembered that the average size of a farm is 150 acres. The contractor is usually of a progressive type. To him falls the lot of testing new

machines as they come on to the market. Many contractors today are equipped with V.H.F. radio transmitters and receivers, and, during the height of the season when contractors have to save every minute, such apparatus enables machines and operators to be diverted to the nearest job and is of assistance in obtaining spares quickly.

Therefore, when they were approached regarding the possibility of applying ammoniacal liquor as a direct fertiliser to the land, the contractors saw the value of the suggestion and immediately set about developing the service. Each approached the operation in his own way, some merely providing the application service, leaving the transport of liquor from works to field in the hands of bulk haulage contractors. Others obtained tankers and carried out the whole operation from works to land. A close liaison exists between the contractors supplying the service. They hold meetings at frequent intervals and exchange views.

Fig. 2.—Boom suspension on application tank.

An important point soon came to light—namely, that time-saving is essential to this service. It became clear that a relay tank must be used for transporting liquor. When the 'mother' tank arrives at the start of an operation, a relay tank capable of holding about 1,000 gal. should be filled, as well as the applicator, in order to avoid any hold-up in the working of the applicator. This is especially important when operations are carried out on land at some distance from the source of liquor supply.

Suitable experimental booms have been constructed cheaply, and Fig. 2 shows an example.

Ammoniacal liquor may be applied to grassland between January and October. Experimental work on the effect of application during the remaining months is in progress. It is hoped to bridge the winter gap and avoid storage difficulties at gasworks by applying liquor to certain hill lands during the winter. Sufficient experience, however, has not yet been gained in order to reach definite conclusions.

It is well known that the drainage ditches of many fields not only carry off surplus water but may also carry combined nitrogen in solution, although any such loss is partially counterbalanced in winter when the nitrifying bacteria are not so active and loss of the very soluble nitrate is reduced.

Concerning the costs of applying the liquor various calculations have been made. The Ministry of Agriculture and Fisheries, as from July 1, 1952, arranged to contribute towards the cost of ammoniacal liquor for application to the land as a fertiliser.

Rates of contribution are those specified in the Schedule to the Fertilisers (England, Wales and Scotland) Scheme, 1952:—

Any other inorganic or synthetic nitrogenous fertiliser:

For each 1% or part thereof *pro rata* by weight of nitrogen, 3s. per ton.

The contribution is subject to the supply of a minimum quantity of 4 cwt. In no event will more than 50% of the cost to the occupier of the land be paid.

This latter proviso might apply if there were cases where ammoniacal liquor was supplied at a nominal cost or given away.

It will be seen from the above that crude ammoniacal liquor would qualify for a contribution of the order of 12s. per 1,000 gal. for a content of 1% nitrogen.

Table 2 shows the effect of various strengths of crude liquor on the fertiliser subsidy, while Table 3 shows the

TABLE 2

Fertiliser Subsidies for Various Strengths of Crude Liquor

Strength of crude liquor in ounces	Equivalent to: % Total ammonia w/v	% Nitrogen w/v	% Nitrogen w/w	Specific Gravity of Crude Liquor at 60°F.	Weight of 1,000 gal. crude liquor in tons	Fertiliser Subsidy per 1,000 gal. of crude liquor: per 1% w/w nitrogen	for ounce strength shown
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
						s. d.	s. d.
5	1.08	0.89	0.88	1.014	4.53	13 7	11 11
6	1.30	1.07	1.05	1.017	4.54	13 7	14 5
7	1.52	1.25	1.22	1.020	4.55	13 8	16 8
8	1.74	1.43	1.40	1.023	4.57	13 9	19 3
9	1.95	1.60	1.56	1.026	4.58	13 9	21 5
10	2.17	1.78	1.73	1.029	4.59	13 9	23 9
11	2.39	1.96	1.90	1.031	4.60	13 10	26 3
12	2.60	2.13	2.06	1.034	4.62	13 10	28 6
13	2.82	2.31	2.23	1.037	4.63	13 11	31 0
14	3.04	2.49	2.39	1.040	4.64	13 11	33 3
15	3.25	2.67	2.56	1.043	4.66	14 0	35 9

Column (6) and (7) based on 3s. per ton for each 1% or part thereof *pro rata* by weight of nitrogen.

Note:

Column (1) obtained by $\frac{\text{oz.}}{4.61}$

" (2) " " $\frac{\text{oz.}}{4.61} \times 0.82$

" (3) " " $\frac{\text{oz.}}{4.61} \times \frac{0.82}{\text{Sp. gr.}}$

" (4) " " $\left(\frac{\text{oz.}}{1.75} \times 0.5 + 100\right) \div 100$

" (5) $\frac{1{,}000 \times \text{Sp. gr.} \times 10}{2{,}240}$ = tons

" (6) Tons crude liquor (column 5) × 3s.

" (7) % Nitrogen w/w (column 3) × column 6.

equivalent gallonage of liquor in comparison with 3 cwt. of ammonia per acre.

The gross cost of applying liquor to the land as a fertiliser is £6 10s. per 1,000 gal., of which, at the present time, about 40% is represented by transport charges, 40% by application charges, and 20% charges due to the Gas Board. The South

TABLE 3

Subsidies for 1,000 gal. of Crude Liquor and Crude Liquor equivalent in nitrogen content to 3 cwt. per acre of Sulphate of Ammonia.

Ounce Strength	Crude Liquor: % total NH_3 w/v	% nitrogen w/v	% nitrogen w/w	Subsidy per 1,000 gal.	Crude Liquor equiv. to 3 cwt. per acre of Sulphate of Ammonia: Gal. per acre	Subsidy
				s. d.		
5	1.08	0.89	0.88	11 11	793	
6	1.30	1.07	1.05	14 5	659	
7	1.52	1.25	1.22	16 8	564	
8	1.74	1.43	1.40	19 3	493	
9	1.95	1.60	1.56	21 5	441	
10	2.17	1.78	1.73	23 9	396	9s. 6d.
11	2.39	1.96	1.90	26 3	360	
12	2.60	2.13	2.06	28 6	331	
13	2.82	2.31	2.23	31 0	305	
14	3.04	2.49	2.39	33 3	283	
15	3.25	2.67	2.56	35 9	264	

Note: Ammonia contains 82% nitrogen. Sulphate of ammonia contains 21% nitrogen.
Subsidy for 3 cwt. sulphate of ammonia is 9s. 5d. based on £3 3s. per ton.

Western Gas Board produces each year 48 mil. gal. of ammoniacal liquor, which it is hoped will make a reasonable contribution to the requirements of nitrogenous fertilisers.

It is not suggested that crude ammoniacal liquor is a 'cure-all' so far as nitrogenous fertilisers are concerned, but it is felt that, in many suitable cases, it represents a source of national value which merits close examination.

WATER GAS FROM BITUMINOUS COAL

SPRINGS GASWORKS, S.A.

THE absence of a widely-available public gas supply has always been a feature of domestic and industrial life in the Union of South Africa and until recently the only gasworks were those situated in Johannesburg, Cape Town, Port Elizabeth, and Grahamstown. The very rapid expansion of industry in South Africa during and after the war accentuated the desirability of integrating a gas supply with other essential services, and among the newly-developed areas it was at Springs, on the Witwatersrand, that the first concrete steps were taken in this direction. Early in 1948 the Town Council of Springs was approached by a number of industrialists with the request that the possibility of the supply of gas within the industrial area at New Era be examined. It was anticipated that the main users would be firms engaged in galvanising and annealing, the smelting of aluminium and alloys, non-ferrous billet heating and heat treatment, the roasting and baking of cereals, and the heat treatment of glass. A preliminary survey revealed that the initial demand for gas would be in the region of 750,000 cu.ft. to 1 mill. cu.ft. per day, and that at first the load would be entirely an industrial one.

During the initial step of choosing the method of gas manufacture, the decision was made that the fluctuating nature of the industrial load would make the installation of carbonising plant uneconomic. The continuous operation of carbonising retorts, which is normally desirable, would have necessitated the installation of a plant of small capacity with a large gasholder in order to average-out the peak demand during the day and the anticipated low demands during the night and at week-ends. Another and perhaps more important factor militating against the use of carbonising plant was the growing shortage of good quality carbonising coal. The abundance of coal suitable for gasification, on the other hand, led the engineers of the Springs Town Council to concentrate their attention on the obvious alternative of a water gas installation which would, in addition, satisfy the demands of the industrial load by virtue of its being both flexible in output and capable of being shut down and started up at very short notice. Following an investigation into all aspects of the project, the Power-Gas Corporation, Ltd., of Stockton-on-Tees, and their subsidiary Company in Johannesburg, Ashmore, Benson, Pease & Co. (Africa) Pty., Ltd., where entrusted in October, 1949, with a contract for the supply and erection of the bulk of the equipment to form the new gasworks at Springs. The contract covered two units of carburetted water gas plant with a steel-framed building to house the plant and machinery, and the auxiliary equipment included coal-fired boilers, oil and tar storage tanks, gas washers, electrostatic detarrers, relief gasholder, exhausters, purifiers, and meter and governor.

The Water Gas Plant

The carburetted water gas plant at New Era consists of two units each having a rated daily productive capacity of 1 mill. cu.ft. of gas with a declared calorific value of 400 B.Th.U. per cu.ft. Under conditions ruling at present only one unit is in operation supplying all the gas required by the industrial consumers. The installation of a standby unit is standard practice where water gas plant accounts for the total or part of the base load of a gasworks and uninterrupted gas production has to be ensured. All auxiliary and gas purification equipment is dimensioned to handle the gas produced when both units are in operation, and the gasworks has therefore sufficient reserve capacity to cope with a large increase in the present demand for gas. The gas generators have an internal diameter of 6 ft. and are of the water-jacketed, wet base, mechanical design incorporating automatic ash extraction. The present method of feeding coal to the generator is by intermittent 'dump-charging' through a manually-operated charging door, but provision has been made for the addition of automatic cyclically-operated coal feeding gear at a later date. The coal charging skips are filled manually at ground level and elevated to the operating platform by means of an electrically operated hoisting and traversing block. The top of the generator is water cooled and the upper portion of the generator shell is lined with refractory brickwork backed by a layer of insulating material. The lower section of the generator incorporates an annular jacket boiler for raising steam at a pressure of 100 lb. per sq. in. The jacket boiler is equipped with the usual mountings and fittings such as steam, feed water, and blow-down valves, safety valves, water-level gauges, high and low water level alarm, and automatic float controlled water feed valves with auxiliary hand control. The ash is continuously discharged from the revolving ash bowl by means of an inclined stationary shovel and is collected in bogies or wheel-barrows. The ash bowl and grate are rotated by a unit comprising an electric motor coupled through a reduction gear and adjustable friction drive to a circumferential worm rack on the ash bowl.

Ignition Dome Carburettor

The carburettor is lined with refractory and insulating brickwork and is chequerless. Gas enters from the generator at the top and there is opposed oil injection from a spray near the base to give the well-known features of the ignition dome type of carburettor. A grit arrester of the angle-pocket type is installed between the generator and carburettor. The oil is sprayed counter-current to the downward flow of blue water gas in the carburettor, where it is vaporised. Cracking of the oil to yield gaseous hydrocarbons proceeds in the base of the carburettor and is completed in the superheater. The superheater is lined with refractory and insulating brickwork and, unlike the carburettor, has a filling of stacked chequerbricks. The gas inlet from the carburettor is at the base and the gas outlet at the top leads to an elevated conical base wash box. The back-run gas main from the base of the generator is connected to the gas main entering the wash-box.

Air is supplied to the plant during the blow period of the water gas cycle by means of a blower. Two blowers are provided, one acting as a standby unit. One blower is driven by a direct-coupled 80 H.P. squirrel-cage electric motor operating on an A.C. supply while the other is powered through a reduction gear by a 75 H.P. steam turbine designed to use steam at a pressure of 100 lb. per sq. in. Either air blower is capable of delivering the total air requirements when both units of carburetted water gas plant are in operation. This is obtained by 'stepping' the operating cycles of the two units so that the blowing periods do not coincide or overlap.

The primary air supply is led to the base of the generator while the connections for secondary and tertiary air are made into the top of the carburettor and superheater, respectively. These individual air supplies are measured by means of venturi meters. The purpose of the secondary and tertiary air is to recover the potential heat of the blow gases from the generator by their combustion in the carburettor and superheater. The heat generated by the combustion of part of the blow gas is stored in the brickwork of the carburettor and superheater. Combustion of the blow gases is then completed before the hot products of combustion pass from the top of the superheater through a refractory bricklined main and into a horizontal firetube waste heat boiler. The spent gas leaving the waste heat boiler passes through a grit catcher of the Vortex type and then to a chimney by way of a stack valve. Arrangements are made so that the waste heat boiler may

be isolated from the rest of the plant for maintenance purposes and an auxiliary stack valve and chimney are placed at the top of the superheater so that gas-making may continue during these periods.

Steam is raised in the waste heat boiler at a pressure of 100 lb. per sq. in. and the supply from this source is linked with that from the generator jacket boilers. The installation includes two coal-fired vertical Cochrane boilers having a working pressure of 200 lb. per sq. in. for feeding an additional supply of steam into the high pressure system as and when necessary. The high pressure steam is used to power the steam turbine driving one of the air blowers and also the steam-driven boiler feed water pumps and gas exhausters. The turbine exhausts steam at a pressure of 10-15 lb. per sq. in. into a low pressure system incorporating a steam accumulator which copes with the cyclic production and demand for low pressure steam by storing steam during periods when the production exceeds the demand and discharging steam when the converse applies. Low pressure steam is exhausted from the turbine which is working at full load during the blow period. During this time there is no demand for low pressure process steam and it is therefore stored in the steam accumulator. The flow of low pressure steam from the turbine decreases considerably when the turbine is idling during the gas-making periods and under these conditions the balance of process steam is discharged from the steam accumulator. The high and low pressure systems are further connected through an automatically controlled Askania reducing valve so as to supply additional low pressure steam when necessary. The steam driven boiler feed water pumps and the gas exhausters are arranged to exhaust steam at atmospheric pressure. Such exhaust steam is used for tar dehydration. The use for gas-making of low pressure process steam in conjunction with a steam accumulator is a noteworthy feature of the New Era plant. The up-run steam supply is fed into the base of the generator while the back-run steam is connected to the top of the superheater. The quantity of up-run and back-run steam used for gas-making is measured by a Kent meter. Two steam-driven boiler feed water pumps of the vertical double-acting type are included, each capable of supplying the total feed water requirements when both units of carburetted water gas plant are in operation.

The gas oil used for the enrichment of the blue water gas is pumped from the main 10,000 gal. storage tank to the injector situated near the bottom of the carburettor. Two oil pumps of the electric motor driven rotary positive type are provided, one acting as a standby unit. Under normal operating conditions one pump is capable of meeting the total oil requirements when both water gas units are working. The oil injection equipment is water-cooled and automatic steam purge equipment is incorporated to prevent blockage of the oil nozzle.

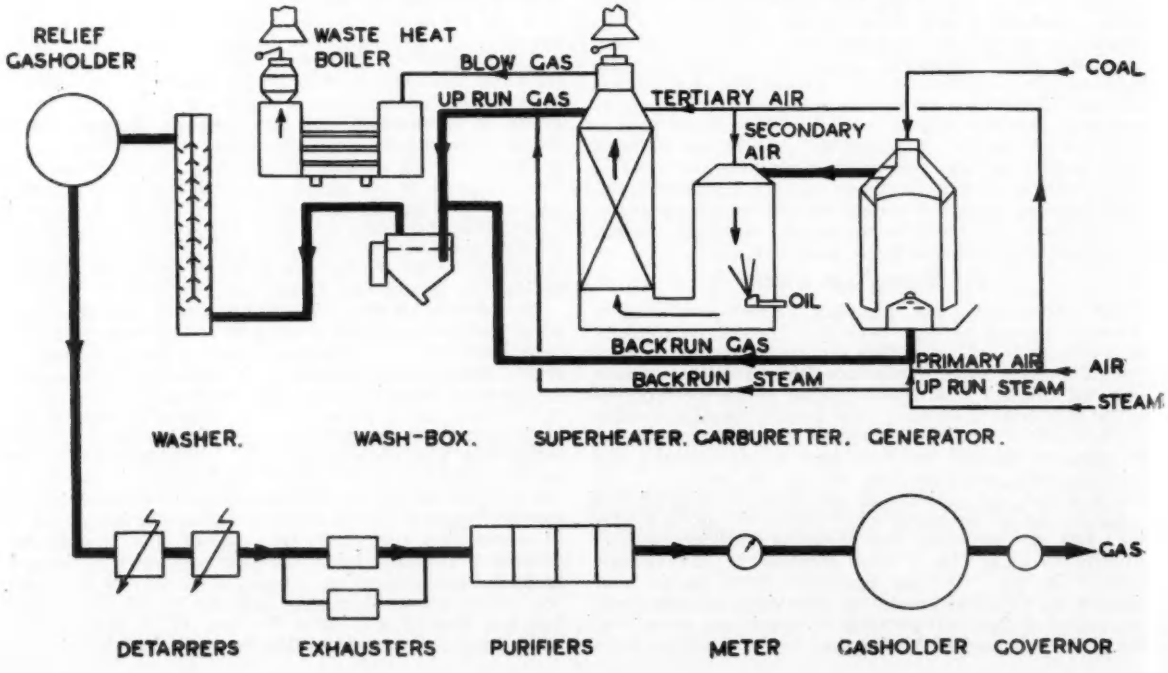
One complete water gas cycle has a duration of 2½ or 3 min. and accurate and constant timing of the cycle is essential to ensure efficient and uniform gas production. The operation of the air, steam, oil, and other valves is therefore controlled by an automatic controller which operates the valves mechanically in a definite sequence. The controller permits adjustment in duration and make-up of the cycle and incorporates interlocking arrangements which stop gas-making and sound an alarm in the event of any attempt to operate the valves in an unsafe sequence. The valves operated directly from the controller are the primary air, secondary and tertiary air, steam, back-run oil, and stack. The up-run gas valve and also the up-run—back-run steam change-over valve are in turn mechanically linked to the back-run valve.

Gas leaving the wash-box is cooled by direct contact with water in a washer of the Lymn type consisting of a tower having a series of alternate cones and discs for efficient distribution of gas and water. Two washers are installed, one to serve each water gas unit. The tar in the gas is partially removed during the passage of the gas through the wash-box and washer.

Purification

The raw carburetted water gas, which is produced cyclically, passes from the Lymn washer into a small relief holder having a capacity of 35,000 cu.ft. From this point onwards the gas is treated in a continuous stream. The first step in purification involves the removal of the final traces of tar in the gas. This is accomplished in two electrostatic detarrers which are laid out so that they may be operated either in series or in parallel. The detarrers are followed by two steam-driven exhausters, one of which is normally in operation with the second as a standby. Each exhauster is capable of delivering 1,500,000 cu.ft. of gas per day against a differential pressure of 30 in. water-gauge. The exhausters are driven by 10 H.P. steam engines. Controlled amounts of air may be admitted into the gas

FLOW DIAGRAM OF SPRINGS WATER GAS PLANT



stream at this point to assist in the revivification of the iron oxide in the purifiers. For this purpose each exhauster includes a small air blower driven from the engine coupling. From the exhauster the gas passes to a set of four mild-steel welded purifiers for the removal of hydrogen sulphide, the boxes having connections enabling them to be operated according to a conventional system of rotation. Each box measures 30 ft. by 25 ft. by 5 ft. deep and the installation includes a hand-operated travelling

Automatic and Hand Controls on Generator Jacket Boiler. Conical Base Seal Box in rear.

crane for cover-lifting. Gas entering the 750,000 cu.ft. main storage holder is measured in a Connersville meter which is complete with the usual by-pass valves and connections and recording instruments for pressure, volume, temperature, and time. A governor of the wet type is situated on the outlet of the storage gasholder to regulate the distribution pressure. The accompanying diagram shows the flow of gas through the various stages of its production and purification. Provision has been made for the installation of ammonia washers between the exhausters and purifiers should this be found necessary at a future date.

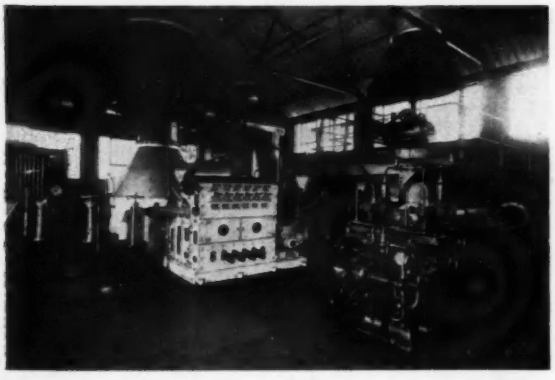
Operating Results

The rated capacity of a single unit of plant at Springs was 1 mill. cu.ft. per day of 400 B.Th.U. (gross) carburetted water gas. This rating was based on the use of a blow-run in which the operating cycle is modified to let a portion of the blow gases pass to the holder, thereby increasing the volume of gas produced and lowering the calorific value. A characteristic of the gas so formed would be a nitrogen content of about 20%. When producing a low nitrogen 'straight' carburetted water gas with a calorific value of 360-380 B.Th.U. per cu.ft., and using a small quantity of carburetting oil, it was anticipated that the output of the plant would be reduced by 20%-30% according to the type of coal used. In addition, the rating specified the use of coal having a grading of 3-4 in.

Since the commencement of operations at Springs, Kendal, Springfield, Springbox, and Koornfontein coals have been gasified successfully to produce both uncarburetted and carburetted water gas, and in many cases the output of the plant has exceeded the rated output even when using coal of inferior grading. The following operating results were obtained during the course of a test on one unit when using Kendal coal and producing an uncarburetted water gas with a calorific value of 340 B.Th.U. per cu.ft., no blow-run being used.

Gas output per day (at 60°F. 30 in. Hg. saturated)	895,000 cu. ft.
Calorific value (gross at 60°F. 30 in. Hg. saturated)	340 B.Th.U per cu. ft.
Oil used per 1,000 cu. ft. of gas	*Nil*
Coal used (theoretically dry basis) per 1,000 cu. ft. of gas	49.5 lb. (approximate only)
Low pressure process steam used per 1,000 cu. ft. of gas	54.2 lb.
Gas analysis (% by volume)	
CO_2	3.0
CnHm	0.4
O_2	0.4
CO	36.2
H_2	47.0
CH_4	6.4
N_2	6.6
Name of coal	Kendal
Grading (% by weight)	
Greater than 3 in.	38.0
2 in.—3 in.	34.6
1 in.—2 in.	13.2
½ in.—1 in.	2.2
¼ in—½ in.	1.1
Less than ¼ in.	10.9
Analysis of coal as charged (%)	
Moisture	3.1
Ash	16.9
Volatile matter	31.7
Fixed carbon	48.3

Control Room with the Positive Displacement Rotary Meter on the left, the Instrument Panel in the centre, and the District Governor in the right foreground.



Operating Platform showing, right, the Automatic Control Device for the Works Steam System. In the centre can be seen the Automatic Mechanical Operator which times and operates the plant valves in correct sequence for the cyclic manufacture of gas.

Conclusion

The New Era gasworks at Springs is believed to be unique in one respect. It is probably the first gasworks in the British Commonwealth where gas is produced exclusively by gasifying coal in water gas generators. Coke is usually regarded as the ideal fuel for water gas manufacture; yet coal has been used in quite a number of cases. However, the use of coal for this purpose is still the exception rather than the rule. The coal for gasification should be non-splintering, should not disintegrate on heating, and should have only slight caking properties. A well-screened product of close grading is generally recommended. When installing water gas plants to operate on coal it is necessary to bear in mind that the output of a generator when using coal is only 70%-80% of the output when using graded coke of similar size. Special attention has to be paid to the means for effectively dealing with the relatively large amounts of tar which are formed when coal is gasified. In the Springs plant this has been done by using a conical base wash-box instead of a flat-bottomed wash-box to prevent settlement of heavy tars and foreign matter, and a direct-contact washer instead of a tubular condenser to avoid the blockage of tubes. Care has also to be taken in both design and operation to ensure efficient combustion of the blow gas from the generator to avoid the presence of smoke in the waste gas at the stack.

COKE AND THE FUTURE

F. S. Evans—concluded from p. 46, January 6 issue

What we want to overcome this competition from oil and from washed singles and untreated bituminous smalls in under-feed stokers is new designs of automatic coke-burning equipment which will work with efficiencies of around 75%. Much thought has been given to this matter by appliance manufacturers, encouraged by the Technical Committee of the Coke Department of the Gas Council. Today there are several such appliances on trial and in production and use, which are working at these higher efficiencies.

New Coke-burning Appliances

All these models are gravity fed and thermostatically controlled, the majority having only two speeds, either rated full combustion or idling speed. Some of them dispense with firebars and are so designed that clinker is formed to retain the ash and they have a simplified method of ash removal. The majority need no attention for 12 hours at maximum output or 24 hours at half rate.

Appliances such as the Suké, Copperad, Cokamatic, will work efficiently on boiler nuts, coke beans, or breeze. To develop such appliances on boiler nuts might interfere with our natural development of the domestic market. Conversely development on ordinary breeze would in no way assist our main coke problems, except that as times goes on we may be involved in more cutting of coke and consequently a greater production of breeze.

A better course to my mind is to produce and market a special automatic stoker fuel for these appliances, say of the grading of $\frac{1}{4}$ in. to $\frac{3}{8}$ in. or $\frac{1}{2}$ in. This material would sell readily at about the price of bituminous smalls, and the undersized material—$\frac{3}{8}$ in. breeze—has today a ready market for electricity power stations, for it is now fairly firmly established that a small proportion of breeze, and possibly fine breeze, mixed with their coal reduces or eliminates 'bird-nesting.'

In addition, for the coke industrial markets there are two interesting developments:—

(1) The semi-producer furnace, which has been fostered by the Coke Department of the Gas Council and for which coke is the pre-eminent fuel. Already excellent work is going on in its application to the brick and clay products industry, and it would be capable of a wide scope in usage.

(2) The down-jet principle of combustion, which was originally developed by the British Coal Utilisation Research Association and described in the *Journal of the Institute of Fuel* for January, 1950, is novel in its conception, efficient in use, and capable of a wide range of uses. For it, coke is not only the pre-eminent fuel; it is so far the only fuel. We have had some experience at the Old Kent Road works and are very satisfied with the performance of these "Magnacalor" furnaces. We find on the district that it is a very valuable weapon in combating oil competition.

To sum up, the position in this market is that our present prices are high. In spite of this, for smokelessness, some of our customers will continue with coke, hand-fired; and for those who desire automatic firing there are now efficient units in production, from 25,000 B.Th.U. per hour to 2 mill. B.Th.U. per hour, not only to replace old apparatus in existing markets with coal and coke, but also for extensions to some new uses, all of which can prove competitive and economic at today's price levels.

The Domestic Market

The Press agitation and the public nervousness in relation to smog is surely our golden opportunity for increased sales of both gas and coke, and for the possibility of increasing our prices of domestic coke. Although we do not know the precise killing properties of smog, there is a *prima facie* case that the installation of 3 mill. approved grates, mainly in the London area, probably two-thirds being misused to the extent of overnight burning of bituminous coals, in the climatic conditions of last December landed us with a pea-souper reminiscent of 50 or more years ago.

The present cost of house coal and the smog menace should do much to increase our sales of coke and gas domestically; and increased consumption per consumer would reduce gas prices. The concentration of all our efforts in this direction should yield excellent results.

The price relationship of gas to coal has improved and should give us opportunity. But the present price of coke, as it is in the South approximately at Grade 4 house coal datum level, is very competitive, for on these new appliances coke is 25% to 33% more efficient than house coal. With the right quality coke we could overcome the remaining public prejudices, extend our business and, ultimately, obtain higher prices. It may well be that domestic coke will become a more dominant factor in the economics of gas manufacture, and at least it deserves the maximum of interest and attention from gas engineers.

Qualities Must be Improved

I would make it clear that in my opinion we cannot gain this market with our present qualities and our present facilities. On quality, the most pressing need is the reduction or elimination of shale, and I am given to understand that so far as Durham coals are concerned—and most of us use Durham coal—cleaning plants are now being installed rapidly, and that over the next two or three years there will be a considerable reduction in the ash content of these coals. If we get back to 4% or 5% ash content in gas coals it will be a big step forward.

I recognise from the periodic returns of my Board, and no doubt it is true of other boards, that engineers are doing their best to conform to the Gas Council's quality standards, but so far without complete success. These standards are very similar to the standards suggested by the Coke Quality Panel of the London and Counties Coke Association. Some of you may know that, when I presented that Panel's report to the Technical Commitee, I prefaced it with the remark that the standard was the absolute minimum the Panel could recommend. I might have added, the minimum for coke grates, for in those days we knew none other. But the change of firebar spacing that has crept in during the last two years now means that we must have a more reactive coke than that standard if we are to get all the business back. In other words, we must have the performance laid down in the standard but on an appliance with a bar spacing of 17/32 in. or 18/32 in. instead of a standard Fulham firebar spacing.

Service Must be Improved

We must also improve our service. We must deliver this coke to the customer as he wants it, and the diversity of this domestic demand differs greatly from industrial and semi-domestic uses and from the diversity of the production and availability for sale of coke. For example, so far as production is concerned, in one Division in my Board where until recently there was no water gas plant and which, in addition, supplied gas in bulk to a neighbouring Division to meet their peak demands, the diversity of gas load (and the production of coke) between summer and winter was 1 : 1½. At another works where water gas plant is used, the diversity of production is 1 : 1.3.

The demand for coke for process work is generally equally spread throughout the year, and on large-scale heating units, on account of their ability to stock, the diversity load factor is around 1 : 2; but in domestic usage the average in South London is 1 : 6, and 1 : 10 in those cases where stocking facilities are negligible.

For a business built-up over the years and consisting of 15% process, 60% semi-domestic, and 25% domestic, and collating this with the production on the basis of 1 : 1½, for this business it is necessary to have a stock of 9% or

(*Continued on p. 103*)

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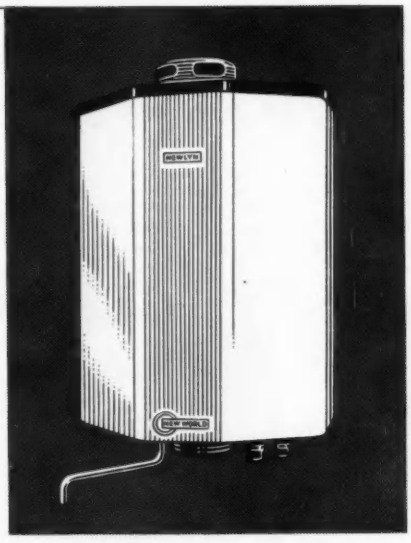
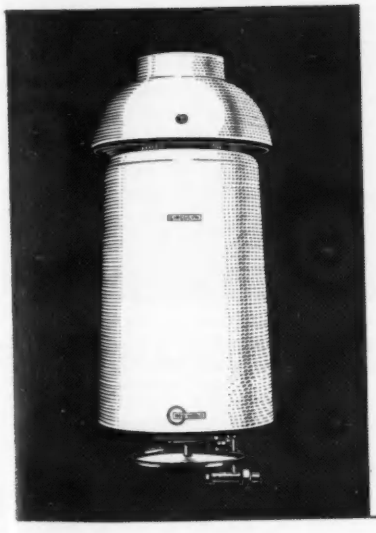


The NEW WORLD provides...



FOR THE CONSUMER

Abundant hot water on tap immediately available at the same temperature, winter and summer, with economy strictly controlled by the Regulo . . . **Maximum Service**

FOR THE UNDERTAKING

Normally no alteration to the meter service, no peak load problem and nothing further to worry about . . . **Minimum Servicing**

THE CIRCULYN

The NEW WORLD Circulyn can be fitted to an existing hot water system as an auxiliary, or as the sole means of supply and gives an abundance of hot water summer and winter to the bath, basin and kitchen sink: it does not dispense with the airing cupboard facilities.

THE NEWLYN

The NEW WORLD Newlyn Sink Heater, in a normal household working day of 16 hours, gives 75 gallons of hot water at 140°F., at the kitchen sink or hand basin. It holds the same temperature summer and winter; hot from the first drop.

RECOMMEND

NEW WORLD
PRODUCT OF Radiation Ltd

Royston S.A. INSTALLATIONS

TOTTENHAM ✓
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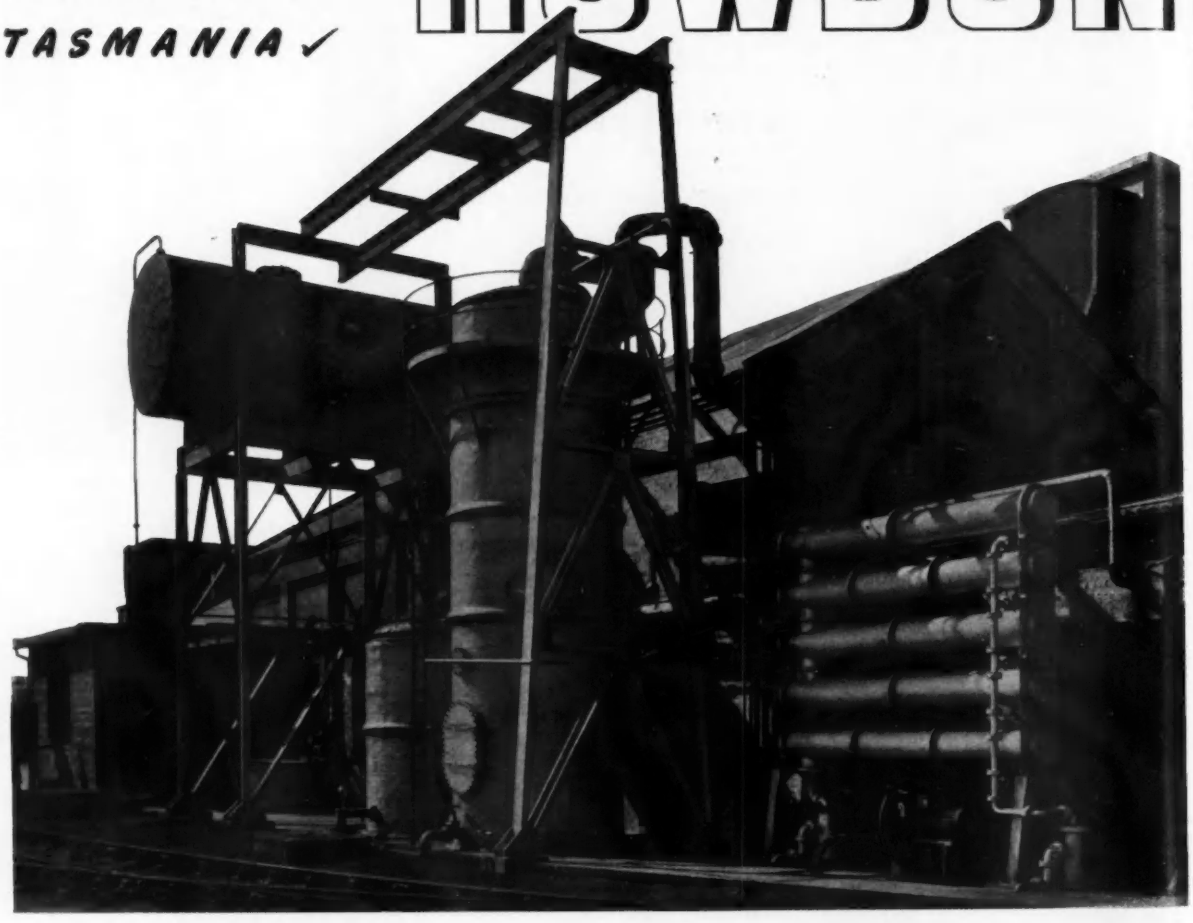
PORTUGAL ✓
TASMANIA ✓

And now

HOWDON



Output 12 tons per day *OF GRADE I SULPHATE OF AMMONIA*

This Royston plant is also equipped with Stainless Steel Heat Exchangers, Stainless Steel Condensers, Tile-lined M.S. Still having no cleaning doors to cause leakage or permit heat emission losses. Uses pass-out steam.

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10% of the year's production by the beginning of the winter if all the seasonal demands are to be satisfied. If on these works the coke trade was all for domestic users, the stock necessary to meet the demands of the average winter would equal 20% of the year's make, and to meet a hard winter (an unavoidable obligation if we are to satisfy this market) 25% of the year's production, or more.

Not only must these stocks be available; they must be recoverable at a speed to satisfy demand quickly. Most of these new appliances are in new or relatively modern houses and flats, and it is proverbial how meagre is the fuel storage capacity of such dwellings, so that, if we are to build up a good domestic connection, we must not, even at the peak periods of demand, have delivery delays, either in our direct business or with our merchants. Therefore, in general it is necessary at works with an all-domestic trade to be able to send out at least double the maximum winter make. To do so it must be possible to recover from stock, re-screen, or debreeze and load at a rate of at least equal the maximum daily winter make of coke—that is, coke from the retort house before any is set aside for water gas manufacture.

The development of this domestic market will increase the demand for sized coke, particularly 2 in.—1 in. size, and we must have additional grading plant and more cutting to meet this demand. We must accept an added production of breeze as an unavoidable corollary.

Essentials for Domestic Market

The expansion of the domestic market, if it is to be successful, needs careful attention. The product must be satisfactory; the service must be excellent; the propaganda, salesmanship, and installation of appliances must keep step with works development. We want no disappointments for our customers, no checks on development.

The added production of breeze should present no great difficulty. In addition to the outlet for breeze mentioned earlier, there are developments of the Oldbury and sprinkler stokers for shell-type boilers and for chain-grate water-tube boilers. On the latter, ease of ignition can be obtained by double ignition arches or other methods of re-cycling the hot gases or by spraying oil over part of the fuel bed. Already new markets are opening-up under these headings, markets which put a limit on the upper size of breeze rather than on the percentage of fines. Indeed, at our tar works we have burned coke dust—material 90% to 95% below ¼ in.—and obtained excellent results. I have every hope that as this market expands we shall be able to justify and obtain higher prices than generally exist today.

Conclusions

To cheapen the price of gas, to maintain and increase our coke revenue, to make the best use of our national resources, and to minimise the perils of smog, we must develop a domestic market for smokeless fuels, both gas and coke. It would be a good national plan if we ensured that smoky coal was used only in the larger appliances where, with the provision of proper apparatus, properly designed furnaces, and trained stokers, coal can be consumed without the generation of smoke and with good efficiency. Domestic usage should be exclusively confined to smokeless fuels.

We should take active steps to give effect to this plan by channelling ever-increasing supplies of coke into the domestic market, so that eventually, except for those industries in which the use of coke is necessary on technical grounds, all coke should be sold in the domestic market; and we should re-orientate our works and our services to achieve this end.

We should note with interest that the public is, at least at present, prepared to take all the available supplies of what they consider to be the higher grades of smokeless fuels—fuels which sell at £3 or more a ton in excess of coke prices. The National Coal Board has made it clear that it is planning considerably to augment the production of carbonised ovoids, and it has been emphasised that the consistent characteristics of this fuel made it well worth much more money than other solid fuels. There is no reason why the coke industry should not equally market, from at least some of its works, branded coke with good reactivity and low ash at prices well in excess of the added cost.

The stability of the revenue from a standard grade of domestic coke and the added revenue from the proposed branded coke, would react to cheapen the price of gas and to start the downward spiral of prices which we in the gas industry consider essential for the nation's welfare.

DISCUSSION

Mr. D. G. Rose (Vincent Street), opening the discussion, said that on the subject of coke economics became rather entangled with ethics. In economics one was concerned with what was and in ethics what ought to be. So often there was confusion of this kind in the literature of the industry, as well as elsewhere. It was easier and more congenial to offer advice than to study the problems. Mr. Evans should be commended for his paper which was not only commendably brief, but had given the means of studying the real problem that faced the coke side of the industry today. Mr. Rose underlined some of the facts given by Mr. Evans. Coke was used in a number of different ways, and each of the types of coke produced had its own characteristics and attributes. The problem of large coke was one to which the engineering side of their association should be giving the thought that Mr. Evans had indicated. Were all the cokes that were now so plentiful suitable for use in the open fire, even if the larger sizes were made-to-measure? One of the points from the paper was the need for flexibility on the works in the way of handling facilities, and for meeting those demands that Mr. Evans had said could rise to such very big peaks with the domestic trade. There should also be flexibility in the yields of different sizes and the stocking of appliances.

Mr. Evans, replying, said he had tried to make his point on flexibility very simple. He had omitted the complexities of different coals, different carbonising plant and conditions, because he felt that the best thing was to compare cokes and set one's standards on the actual performances of the cokes in the appliance. He agreed it was essential that the demands of gas-making plant must not interfere with the demands of the coke consumer. Domestic and industrial gas salesmen should help all they could in selling coke. The two tasks were not similar. The coke salesman's first job might be to demonstrate to the consumer that to use coke was cheaper or better, and if he managed to prove that, he still had to persuade the consumer to buy the coke through him, not only on the first occasion but on every subsequent occasion.

Any Future—Unless?

Mr. C. A. Deas (Woodall House) asked if Mr. Evans thought coke had a future at all, unless more attention was paid to its preparation. It was usual to blame the poor quality of coal, but he suggested that was only one of the things that were wrong. Far more attention had to be paid to the screening of coke, moisture content, and 'burnability.' Coke was still the Cinderella of the industry. People talked about a 'two-fuel' industry and yet a lot of gas engineers were not interested in coke, apart from getting if off the works. He knew Mr. Evans would agree that coke was only 10% of the solid fuel production of the country, and one could not be too much influenced by the fact that there happened to be a bit of coke knocking about today. If there was a shortage of house coal there was a big demand for coke and gas coke production was probably near its peak. The gas industry would soon have to look to other methods of producing gas. He thought there would be more coke in general; more from the coke ovens and less from the gasworks. The author had said a national fuel policy was needed. Mr. Deas said he doubted if there would ever be one at the present rate of progress. Domestic coal prices were not too high, went on Mr. Deas, but utilisation efficiency was too low. The only thing to do was to make coal more expensive and thus make people buy more efficient appliances. He asked Mr. Evans what he considered to be an excessively high coke price.

Mr. Evans said if the same sort of reliable service were given with coke as it was with gas, then coke would have a future. An excessively high coke price was one which was higher than the generally high level. (Laughter). To increase the price of coal further might be very good if we did not have to buy food and carry on an export trade.

Dr. F. J. Eaton (Watson House) said the starting of the authorised distributors scheme was a big step forward in coke marketing. It gave the distributor who was prepared to give a service, something extra for his trouble, and would make

(*Concluded overleaf*)

him look far more to the technical side than he had ever done. It would also help in the selling of coke.

Mr. Evans replied that the main reason more technical knowledge was required with coke than with coal was that anybody could burn coal but there were many people who did not know how to burn coke.

Mr. N. R. Junkison (Vincent Street) said it was intended that the coke grate should be a gas-ignited grate, but as the gas burner was an extra on the price of the grate itself, it was quite obvious that many hundreds of thousands had been fitted without the gas-ignition.

Mr. Evans agreed but said his only criticism of what Mr. Junkison had said, and it applied to gas salesmen generally, was that he seemed to think only of the open fire in relation to coke sales. The open fire did not take more than 10% of the total make of coke.

Mr. A. J. S. Wiseman (Beckton) formally moved a vote of thanks to Mr. Evans.

Consultative Council Meetings

NORTH THAMES

Mild Weather Depresses Gas Sales

MR. MICHAEL MILNE-WATSON, Chairman of the North Thames Gas Board, addressed the Gas Consultative Council at its meeting at Westminster City Hall on December 31 on the Board's annual report and accounts for 1952-53, and expressed concern at the adverse effect of the mild weather during the first half of the present winter on the sales of gas.

The Board had every hope of fulfilling its promise not to increase the price of gas before the end of the current financial year, though the extremely mild weather was causing the Board some concern. 'If you cannot sell your product you cannot make any sort of profit, or have any sort of bonus to give out,' he said, 'and we, in common with all the other gas boards, and I believe also the electricity boards, are going through a very quiet period—too quiet for our liking.' As producers and suppliers of gas the Board viewed the mild weather from a rather different angle from that of the consumer, and sales so far during the quarter were about 2½% down on the consumption at the same time last year.

Reviewing some of the main aspects of the report, Mr. Milne-Watson said the Board's record day's output of 342.7 mill. cu.ft. represented 90% of the full rated capacity of the plant. The year's sales showed an increase of 1.4%, and the cost of coal went up by more than 10%, costing the Board an additional £900,000. By way of contribution to 'smog' prevention the Board sent out more gas during the severe fog of last winter than at any time on record. From the time the restrictions on hire purchase terms were introduced in 1952 until they were lifted recently—requiring a substantial deposit and with a drastic limitation on repayment terms—the number of gas water heaters installed was largely reduced. The gas-electric washing machine was now firmly established as a labour-saving device, and with new models coming on to the market the Board was happy about the position.

No Waiting List

In July, 1952, the Board introduced a uniform prepayment supplement throughout the area, replacing some 24 different supplements existing before vesting date. The new method, which meant a reduction for many consumers, had been extremely popular. The range of gas appliances had increased and the purchaser now had a wider choice. Many consumers who had been on waiting lists for refrigerators had been supplied, and the Board now had no waiting list. Old black cookers had been replaced by more modern appliances to the extent of 32,000 during the year, making a total of 245,000 since vesting date. The new cookers used less fuel and the Board estimated that it had effected a saving of 50,000 tons of coal per annum in that way. Consideration was being given to designing water heaters with lower capital and installation costs.

Mentioning the East Coast floods of a year ago Mr. Milne-Watson paid tribute to the loyalty of the Board's employees. When the works at Southend was affected, the sick list in that district was rather heavy, but everyone on the sick list, except the bedridden, turned out and offered to help. Two employees were afterwards decorated by the Queen.

Better Coal Coming?

Answering questions, Mr. Milne-Watson said improved carbonising results were mainly due to greater efficiency; he did not think there had been any marked improvement in coal quality. According to Dr. Burns, the Board's Chief Engineer, there was a faint glimmer of improvement in coal quality. 'Whether that will be accompanied by an improvement in price is another matter,' added the Chairman.

Cost of new plant today was about 3½ times the 1939 figure, and about 1½ times as much as in 1948.

The Chairman was accompanied by Mr. F. M. Birks, Deputy Chairman, and Mr. O. W. Wells, Chief Accountant. The latter answered a volley of questions on details in the annual accounts.

Alderman H. D. Cowan (Ilford), expressing appreciation of the way in which his questions had been answered, said he disagreed in principle with the accumulation of 'abnormal' reserves. On the other hand it seemed to him ridiculous to create an obsolescence and replacement reserve of £600,000, when replacements in this year alone had cost some £6.5 mill. If the Board was charging replacements to capital he suggested it did not need to carry an obsolescence and replacement reserve. Dealing with the question of income tax provision, he thought the Board's advisers had been super-cautious.

Gas Tariff Publicity

Notification was received from the Gas Board that it was arranging to meet the Council's request for better publicity for the domestic two-part tariff, by mentioning this on gas accounts and by informing consumers who are likely to qualify of the advantages of the tariff.

Details were given of five complaints from consumers which had been dealt with since the previous meeting in November.

SOUTH EASTERN

Subsidy on House Journal

CRITICISM of the subsidising by the South Eastern Gas Board of the *Segas Journal* was made by Mrs. M. Pleydell-Bouverie at a meeting of the South Eastern Gas Consultative Council at Caxton Hall, Westminster, on January 5, presided over by Councillor A. B. Constable. She realised that some subsidy was necessary and she had looked through the magazine searching for some inspiration for the people who received it in the industry. She was so concerned about it that she had asked Mr. E. Wood, the Secretary of the Consultative Council, for further details. A number of the individual undertakings which vested in the Board on nationalisation had their own house journals as means of giving information to employees about their work. Some undertakings gave copies away; others made a small charge. She had ascertained that the total cost per copy of the *Segas Journal* was 14.3d., and that each employee was charged 2d. per copy, leaving a net subsidy of 12.3d.

Any house magazine which did its job was worthy of commendation. In the Board's own publication she expected the employee to be given some information about policy, expansion schemes, and what had been achieved. She had searched in vain for a word about what was discussed at the second annual conference at Croydon; there were too many photographs of those who were there.

The Chairman recalled that the same matter was discussed about two years ago, when comment was made about the discontinuance of the issue of copies of the magazine to local authorities. It was at that time decided that as the magazine was entirely a matter of welfare it was not within the purview of the Consultative Council.

Simple Hire Not Encouraged

Complaint had been made by an Ashford consumer that when he enquired at the local showrooms for a cooker on ordinary hire he was informed that for the time being a hired cooker was not available, but he was invited to acquire one for cash or on hire-purchase. The matter had been referred to the Commercial Manager, who had

replied that two grades of cookers, at rentals of 13s. and 16s. 6d. per quarter respectively, were available for simple hire, but that a wider range was available for sale or hire-purchase.

Members commented that it was obviously the policy of the Board to discourage simple hire of cookers; the Chairman hinted that there was some pressure at a high level.

It was agreed to ask the Board if a clear indication could be given as to whether cookers were really freely available for hire, or whether it was part of its policy to restrict their issue in favour of sale or hire-purchase.

At a previous meeting the Council had agreed by a small majority to ask the Board to consider the initiation of a pilot scheme for cooker cleaning service in a small area on terms suggested by the Commercial Manager when he addressed the Council last October.

A communication was now received from the Commercial Manager promising to see if any firm in the Board's area would be interested in providing a cooker cleaning service which could be publicised in the showrooms. Although every care would be taken to see that the service was reasonably satisfactory, the matter must rest between the consumer and the firm. The Board would accept no responsibility for the details of the transactions.

A resolution had been passed at a previous meeting expressing the view that if the Minister of Fuel and Power could not be induced to influence local authorities to instal both gas and electricity in new estates the alternative would appear to be for the Gas Board to enter into active competition with electricity undertakings.

A reply now received from the Secretary of the Board pointed out that electricity boards were able to rely on getting electricity supplies into all houses because of their monopoly of lighting. The Gas Board had no monopoly of any supply and could not, therefore, put itself in the same competitive position. The question of arrangements which should be made by local authorities for supplies of gas and electricity in new housing estates had been very much under discussion lately, and it was likely that some common basis of negotiation on housing developments would be reached. The Board would, therefore, have to leave any action until that had been settled.

The Chairman said he was aware that negotiations were going on 'at top level' between the Ministry, the British Electricity Authority, and the Gas Council, and he gathered they were nearing a point at which a decision would be reached.

Reference was made to propaganda on television, radio, and in other directions on the question of the use of smokeless fuel. Many people, having 'swallowed' that propaganda, had discovered that Coalite was practically unobtainable; some of them had in fact been told that it was being reserved for the 'smog' areas.

The Chairman said that to the best of his knowledge there was a good supply of coke at present, thanks mainly to the long spell of mild weather.

Mr. James Vickers, a stores clerk employed by the North Western Gas Board, was killed when an explosion damaged the governor house and stores at Barrow-in-Furness on January 4. He was trapped in wreckage and died after being found by Civil Defence rescue workers.

WEST MIDLANDS

Praise for Annual Report

PRAISE for the annual report of the West Midlands Gas Board was given at a meeting of the Gas Consultative Council in Birmingham. It was stated by the Chairman (Alderman W. H. Malcolm, Coventry) that the Ministry had complimented them on the publication of the popular edition. The report was passed without discussion and the Chairman said that was really a wonderful compliment.

Mr. G. le B. Diamond (Chairman of the West Midlands Gas Board) said the most important thing was that it should be read particularly by Members of Parliament. Complaints were made that the Board did not give enough information. 'We try,' he said, 'to give as much information as we can. What we want to know is what more you want so that Members of Parliament can consult with the Council. We want to know if there is anything more that is wanted.'

Councillor S. J. Brown (Birmingham) enquired about the present personnel figures, which would be very interesting having regard to increased output as compared with pre-nationalisation days.

Mr. Diamond pointed out that this was dealt with in the report. The rate of labour turnover for 1952-53 was still high but was lower than in any of the three preceding years. A high rate of labour turnover seriously militated against efficiency as there was insufficient time for job instruction and training, and was consequently uneconomic. The number employed at March 31, 1953, was 13,601 against 13,119 a year previously. It would be remembered that when the West Midlands Board took over it was woefully understaffed in the sense that there were quite a number of gasworks where men were working for 16 hours a day for seven days a week because there were not sufficient men. According to figures they were at this moment 400 men short on the gas fitting staff in the Dudley area, and so they were not able to give the expeditious service which they would like.

EAST MIDLANDS

Dealers to Sell Appliances

ALTHOUGH it is the Board's policy in the East Midlands gradually to replace penny meters with those designed for shillings only, it is willing to leave or reinstall—free of charge—penny meters where the change-over would result in hardship to the consumer, the East Midlands Gas Consultative Council was informed at its meeting at Nottingham on January 5. Alderman C. R. Bates, Chairman, thought this piece of information should be given widest publicity.

Representations had previously been made to the Burton Latimer District Council from tenants and other consumers regarding the hardship being caused, particularly to old people, by the abolition of the penny slot in prepayment meters.

Gas supplied by the National Coal Board from its coke ovens was stated to be causing gumming up of gas appliances in the Chesterfield area. Mr. H. C. Martin (Chesterfield), Chairman of the Notts. and Derbys. Divisional Committee, pointed out that consumers who had purchased new gas cookers fitted with governors, and people using gas fires and water heaters, were particularly affected.

It was contended that from whatever source the Board obtained its gas it was responsible to the consumers for its quality, and the Council agreed to draw the Board's attention to the matter.

To promote sales of the Board's approved appliances to consumers in the area, approval has been given to the appointment of authorised dealers.

The Council was told that the purpose of the scheme is to create additional showroom facilities where the public can examine and purchase approved gas and coke appliances. It also invites participation by the dealer in active merchandising of the appliances, and further, to promote and maintain understanding between manufacturer, dealer and the Board.

Dealers authorised, at the discretion of the Board, will include members of the National Federation of Ironmongers, British Federation of Plumbers Merchants, British Building Industries Association, departmental stores and Co-operative Wholesale Societies. The dealer will operate as a selling agent receiving commission on sales. After-sales service will be given by the Board.

A pilot scheme is already operating, but the arrangements may not develop fully until after April 1.

At the Council's next annual meeting consideration will be given to the appointing of representatives from county associations of parish councils to divisional committees.

New Stevenston Houses

A POLICY DECISION on whether houses in new schemes should be all-electric or have electricity and gas will be made soon by Lanark County Council, probably at its February meeting. The costs to tenants of the two systems are being compared, and a report will shortly be presented to the housing sub-committee, which has been given powers to deal with the question.

The matter has arisen over houses at New Stevenston. So far as the first development was concerned it had been intended to install electricity for lighting, and gas for cookers and wash boilers. The South West Scotland Electricity Board, however, indicated that it was 'disturbed' at the estimated low revenue it would receive from those houses against the estimated high capital cost incurred in providing the services, because electricity was being installed for lighting purposes only.

The Board explained that the capital cost of providing supplies for this development at New Stevenston would be £141 per house. When the scheme was fully developed—280 houses—the cost of supplying electricity would be £70 per house. Whatever policy is decided upon, the first 84 houses at New Stevenston will have gas cookers and gas wash-boilers.

a good looker...

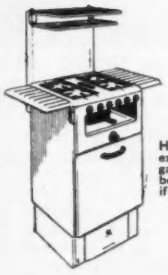
...a fine cooker

No. 20

CENTURY

GAS COOKER

The Century combines efficiency with pleasing appearance, is particularly easy to clean, having vitreous enamelled surfaces throughout—exterior finished in cream . . . The roomy oven gives a high quality cooking performance with a minimum gas consumption, and the whole of the oven space is available for cooking—the base being especially suitable for slow cooking . . . Special oven features include Mainstat heat control, flash-tube lighting to burner, easy-clean rounded corners and drop-type door . . . Used oven heat vented in front of backplate and warms double-shelf plate-rack . . . The hotplate has four burners—all can be used for fast boiling or simmering—and a large griller. Hotplate fittings are removable.



Hotplate side extensions and gas pistol can be supplied if required.

NOTE THE NAME—MADE BY MAIN

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Tax on Electric Appliances Cut

THE effect on the sale of gas fires and water heaters of the reduction of purchase tax on their electrical counterparts has yet to be seen. It depends on what use the electricity industry makes of the news as a platform for publicity, but in general the gas industry is not very deeply concerned.

These purchase tax cuts were among many which were announced on January 4 on behalf of Mr. R. A. Butler, Chancellor of the Exchequer. Those affecting the fuel industries were the reduction from 75% to 50% in the rate of purchase tax charged on electric space heaters, immersion heaters, geysers and circulatory and storage water tanks, and the reduction from 50% to 25% on manually agitated washing machines. This brings electrical appliances into line with similar equipment operated by gas, which is at present charged at 50%.

The *Financial Times* pointed out that Chancellors of the Exchequer have quite often in the past made changes in purchase tax rates between Budgets, but the present reductions do not resemble these previous cases. Before this year such cuts have always been designed to meet a specific need and have affected only one or a small number of items. Now the Chancellor has made a series of concessions, not, it is true, very expensive ones, but ranging widely. It is probable that in choosing to do so at the present time he has been largely influenced by the representations that have been made to him by many industries.

The nature of the cuts and their timing are praised by *The Times*, which in its 'City Notes,' remarked that for some time past associations of retailers and manufacturers had urged the Chancellor to announce changes in purchase tax early in the New Year. For one thing, their stocks were normally at their lowest in January and they would therefore suffer relatively the smallest loss if rates were cut then. More important was the depressing effect on sales between January and April of the public's mounting hopes of tax reductions in the Budget. These hopes had in practice intensified the customary lull in trade after Christmas, and held back early buying for the spring, notably in the case of household goods and cars.

However, a different view was taken by the *Manchester Guardian* which, in a leading article, described the reduction of tax on electric fires as 'rash,' and remarked that there had been no effort to discriminate between sensible and irrational forms of electric heating.

Further Scottish Projects

REFERENCE to 'some satisfactory conclusions' reached at a recent meeting of representatives of the Gas Council and the British Electricity Authority with the Minister of Fuel and Power regarding the question of giving housing scheme tenants freedom of choice between gas and electricity, was made at a meeting of the Scottish Gas Consultative Council in Edinburgh.

Councillor S. Leitch, Glasgow, Deputy Chairman, who presided, said that, beyond the fact that they were satisfactory, they did not know what the conclusions were. He recalled that the gas industry had been pressing for freedom of choice for years.

The Council discussed a request from the Eastern Gas Consultative Council to support a resolution urging the Government to implement the Ridley Report, and to put a national fuel policy into operation. It was decided to adjourn consideration of the matter until there had been a meeting of the chairmen of the Consultative Councils with the Minister of Fuel and Power, which, it was stated, would be held on January 13.

In submitting a summary of projects costing over £1,000 approved by the Scottish Gas Board, the Chairman said it was good to learn that Dumfries Town Council had overturned its previous decision that the Summerhill housing scheme should be 'all electric' and had agreed that the houses should be supplied with gas cookers and wash boilers.

The summary showed totals for September, October, and November, amounting to £196,502. Divisional figures were: Central, £47,384 (Dundee district, £38,894; Alloa district, £6,290; Arbroath district, £2,200); Northern, £9,095 (Aberdeen district, £6,075; Banchory district, £2,000; Stornoway district, £1,020); Glasgow, £8,600; Lanarkshire and South-Western, £130,423; Airdrie district, £5,765; Coatbridge, £2,695; Lanark County, £48,215; Uddingston, £9,970; Motherwell and Wishaw, £2,000; Coatbridge-Uddingston link-up, £3,630; Ayr, £2,662; Dumfries, £11,200; Kilmarnock, £14,822; Newton-on-Ayr, £17,891; Stranraer, £6,768; Annan, £1,386; Auchinleck, £1,428; Muirkirk, £1,991. The largest single item was £24,200 for the installation of a new gas condensing plant (capacity 7,000,000 cu.ft. per day) at the Uddingston gasworks in the Lanark County District. The present condensing plant has a total capacity of 2,500,000 cu.ft. of gas per day and was installed in 1921-24. The plant is inadequate to deal with the present make of gas from the retort house which, except in midsummer, is almost always in excess of 3 mill. cu.ft. per day, and with the installation of additional retorts in 1954-55, bringing the daily make of gas up to 6 mill. cu.ft. further condensing plant will be necessary. In addition it is considered that a water cooling tower should be incorporated in the new plant which, by the use of re-circulated water, will result in a considerable saving in the cost of water from the County Council supply. It is expected that work in connection with the installation of the new gas condensing plant will be undertaken in 1954-55.

Grangemouth Town Council has decided, on the recommendation of the Housing and Town Planning Committee, not to take any action regarding an offer by the South East Scotland Electricity Board to make electric cookers available for hire to tenants of municipal houses. The decision, according to the minute, was made in view of the fact that an overwhelming majority of the tenants of local authority houses in the burgh had shown a preference for gas for cooking purposes.

Dunlop Development

THE increasing demand by the coal, gas, engineering, and other industries for conveyor and power transmission belting, including vee belts, has led the Dunlop Rubber Co., Ltd., to form a new belting division at its Speke factory, which, as from January 1, has taken over technical development, manufacture, and sales from the general rubber goods division. Mr. H. S. Gifford, Manager of the industrial rubber products department of the general rubber goods division, has been appointed Sales Manager of the new division, and Mr. N. F. Twigg, assistant in the general rubber goods technical service department, its Technical Service Manager. The step has been taken because of the growing importance of conveyor belting in industry generally, particularly of flame-proof belting in the mines, and because it was felt that by specialisation speedier and more efficient technical advisory and supply service could be given by concentrating all the company's belting activities in one self-contained division.

Pressure Cookers on Everest

SIR EDMUND HILLARY, conqueror of Everest, is confident that he has convinced other mountaineers of the necessity for pressure cookers as part of Himalayan equipment. He told this to the staff when he toured the works of Platers & Stampers, Ltd., makers of the 'Prestige' Commodore pressure cookers, four of which were used on the successful expedition. The cookers were used for fresh foods at heights reaching 21,000 ft. Sherpa porters cooked rice in them.

Placing his hand on one of the cookers on the dais before him, Sir Edmund said: 'The last time I saw this battered relic it was cooking a good Yak stew in the region of Camp Four.'

Mr. G. R. Brown escorted Sir Edmund and Lady Hillary round the factory while they watched a pressure cooker being made. They were accompanied by the Mayor and Mayoress of Derby. The cooker under process was eventually presented to Lady Hillary by Mr. S. A. Field, Managing Director.

Sixty Boys and Girls under the age of 15 attended the children's Christmas party given by George Wilson Gas Meters, Ltd. Mr. W. D. Wilson, Chairman and Managing Director, together with Mr. F. C. Wilson and Mr. D. C. E. Poole, Directors, attended, and 'Uncle Fred' discharged the duties of Father Christmas with his usual geniality, and cut the Christmas cake. Games, tea, and a cartoon film show completed an enjoyable programme.

A German Inventor is said to have turned part of a Bremen street into Europe's first 'heated thoroughfare.' Herr Martens (33), of Bremen gasworks, has devised a scheme which, he claims, 'may become weapon No. 1 against the dreaded London smog.' The system is that 10 ft. above ground, six gas heaters with reflectors, throw warm air downwards, each covering a 10-yard radius. Gas consumed for a 60-yard long street, it is stated, comes to only 2s. 6d. an hour. British firms are reported to have approached Herr Martens.

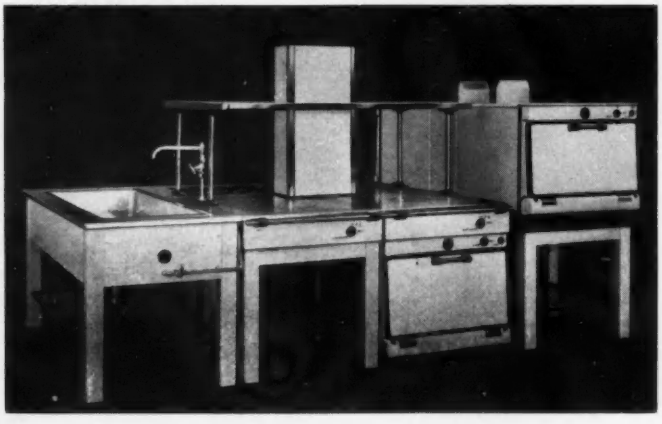
Trade News

Heavy Duty Gas Range

R. & A. Main Ltd., have produced an entirely new range, which makes its appearance at Hotelympia this month. This is known as the Series No. 93 range which has an oven that handles capably everything an oven could possibly be called on to do, and with a 'solid-top' hotplate that gives a complete range of temperatures from fast boiling to simmering, under the control of a single cock. To withstand continuous heavy duty, the range is constructed chiefly of cast iron. Its simple lines, and smooth enamel finish, inside and out, make it easy to clean. Gas controls are conveniently grouped, and servicing is simple because of the availability of controls and piping.

Acknowledging the fact that no two kitchens are alike, and that each installation must be planned for the particular job it has to do, the basic range has been expanded into a series of matching units. These are (*a*) range with 'solid-top' hotplate, (*b*) range with four burners and oven hotplate, (*c*) 'solid-top' boiling table on stand, (*d*) 'open-top' boiling table on stand, (*e*) general purpose oven (no hotplate on stand), and (*f*) general purpose ovens in double tier formation. From these matching items, a multi-unit combination can be built up to form the particular suite which will best meet the individual requirements of any kitchen.

The following additonal items of equipment can be supplied as extras: Potrack mounted on tubular standards from hotplate frame; GG.225 gas griller set in potrack over range; single central flue from four oven central range suite; gas- or steam-heated bain marie on square section legs fitted at-end of central range suite; gas- or steam-heated hot closet fitted at end of central range suite; and ventilation hoods with necessary trunking, extractor fan, etc.



The new range with its matching units

Overall dimensions are 2 ft. 6in. wide × 2 ft. 7 in. deep × 2 ft. 10 in. high, and the oven measures inside 24 in. wide × 24 in. deep × 16 in. high. Gas rating for the solid-top hotplate is 40,000 B.Th.U. per hour; for the oven-top hotplate, 41,000 B.Th.U. per hour; and for the open-top hotplate, 75,000 B.Th.U. per hour.

The oven is heated by two cast iron burners, with 'neat' gas jets, linked to one control. Two pilot lights are fitted, one to each burner, with a single control. Polished stainless steel reflectors, fitted inside the lower front panel, afford visual inspection of the burner flames. The automatic control of oven temperatures is provided by the 'Mainstat.'

The oven is fitted with a drop-down door, with torsion bar spring counter balance outside the heat zone. The door has a rigid cast iron frame, with mild steel external and internal panels enclosing the insulation. It is mounted on substantial gunmetal hinges, and has a cool-type bakelite covered handle.

The 'solid-top' hotplate is heated by a powerful aerated burner, controlled by a single cock. The burner flames are directed towards the centre of the hotplate, firing over a finned cone of heat-resisting cast iron alloy; consequently heat transfer to the hotplate is extremely rapid. The hotplate surface is comprised of a cast iron frame, with radially ribbed insert fillings and 'bulls-eye' cup and ring. The space under the hotplate, surrounding the burner, is lined with refractory brick, to form a heat-storage reservoir which ensures prompt recovery of hotplate temperatures.

The whole of the hotplate surface is ground flat *en bloc* and makes an ideal cooking top, with an intense 'hot-spot' at the centre for really fast boiling and with even graduation of temperature outwards to the edges of the hotplate. A tubular guardrail is fitted along the front of the hotplate.

The alternative 'open-top' hotplate has four similar, high efficiency ring burners, each separately controlled. The hotplate is fitted with robust cast iron grid bars, removable in two sections. Grid bars, burners and burner supports are finished in black vitreous enamel. A slide-out, white enamelled drip tray is set underneath the burners, and splash guards, fixed to the underside of the hotplate frame, ensure that all spillage is directed into the tray.

The gas control taps, and 'Mainstat' oven control, are grouped at a convenient working level on the front of the cooker. All taps have large bakelite control knobs. Injectors are of the fixed type, to ensure maximum efficiency with economy and prevent overfiring. A governor is supplied (though not fitted) with each appliance or battery.

The flues from oven and hotplate are combined at the rear of the range, and are contained within the body, leaving the back panel free of projections.

All piping and controls are situated at the front of the cooker, and are easily accessible for inspection and maintenance. The burner, and all other internal fitments of the 'solid-top' hotplate can all be removed easily, since no fixing screws are used in this assembly. The oven burners are removable from the front of the cooker, after removing the lower front panel.—*R. & A. Main, Ltd., 48, Grosvenor Gardens, S.W.1.*

Nimonic Alloys

Due, no doubt, to the satisfactory results obtained in the gas turbine field from the use of Nimonic 75 for combustion chamber linings, these alloys are becoming well established in many fields where there is a need for a high-temperature oxidation-resistant material. The two alloys of the Nimonic series which are most widely used in sheet form are Nimonic 75 and its modified form, Nimonic F.

An interesting new publication gives information on their annealing and pickling, replacing earlier fabricating instructions. This includes notes on temperatures for annealing and furnace atmosphere, together with formulæ of acid pickles and alkaline liquors, and details of salt bath descaling. Copies may be obtained from *Henry Wiggin & Co., Ltd., Wiggin Street, Birmingham, 16.*

Bray Hydraloader

The Bray Hydraloader is already well known as a useful power-shovel, with a high operating efficiency secured by its special 'power-crowd' hydraulic bucket-control. The Hydraloader already has a wide range of application for many kinds of bulk-movement, especially where flexibility of operation combined with relatively low capital cost is desirable. It has been said that every large factory can save money by using a Hydraloader—even if only to handle its fuel or its rubbish. It is now announced by the makers, that the scope of the Hydraloader has been further extended by new modifications which increase the loading height to 11 ft. 6 in. and correspondingly extend the forward reach. Apart from increasing the height of the dumps which can be made, this means that the Hydraloader can now be used for loading into the highest standard railway wagons. Bulk material of all kinds can thus be loaded direct from mail-side dumps into open wagons, without the capital cost of a hopper, telpher, or crane installation. High-side lorries and hoppers can be loaded with ease without the need of ramps or conveyors. *W. E. Bray and Co., Ltd., Feltham, Middlx.*

Shunting Locomotives

An attractive leaflet has been published by Bagnalls, giving details of the standard range of diesel mechanical shunting locomotives manufactured by the firm. These locomotives are designed and built to give long, trouble-free, economical service. Their rugged construction ensures that they will stand up to the rough work encountered in gasworks. It may be mentioned that frames.

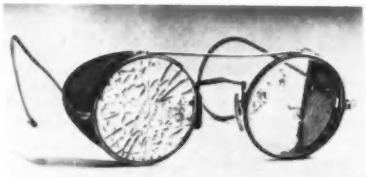
superstructures, wheels, axles, brakes, draw and buffing gear, and other mechanical parts are designed in accordance with the best modern locomotive practice, and that all materials are to the relevant British Standard Specifications. A McLaren cold-starting diesel engine drives through a Vulcan-Sinclair fluid traction coupling and a flexible coupling of the 'Layrub' type to a constant mesh gear box giving four speeds. The changes are effected by four oil-operated cone type clutches. The reversing mechanism consists of bevel gears, and reversing is effected by a simple dog clutch. The final drive is from a jackshaft with fly cranks connected to the locomotive wheels by coupling rods.—*W. G. Bagnall, Ltd., Castle Engine Works, Stafford.*

New Service Depot

The Cambridge Instrument Co., Ltd. has announced the opening of a new repair and service depot in Glasgow. Communications regarding repairs or servicing of Cambridge instruments in Scotland should be sent direct to the depot. Enquiries concerning new apparatus will continue to be dealt with at the London office. The new depot's address is:—*Cambridge Instrument Co., Ltd., Glasgow Repair and Service Depot, 7, Norfolk Street, Glasgow, C.5.*

Eye Protection

Under the Iron and Steel Foundries Regulations, 1954 (No. 1464) which came into force on January 1, it has become necessary, among other things, for certain workers in foundries to be supplied with suitable eye protection. Our photograph shows a pair of spec-



tacles fitted with Armorglas toughened lenses, which was being worn by a man engaged in tapping metal from a cupola. A piece of the metal from the tapping hole flew and struck the goggles and it is possible to see the metal still adhering to the lenses. The heat and the impact were sufficient to fracture the Armorglas in the right eye but no fragments were displaced and the wearer was able to return to his home and family uninjured. Manufacturers of goggles seek to produce articles which will give adequate protection and maximum comfort to the wearer, but it is not often that the success of their efforts is so dramatically demonstrated.—*Fleming Safety Goggles (Division of J. & R. Fleming Ltd.), 146, Clerkenwell Road, E.C.1.*

Coupling and Gear

From the Holset Engineering Co. we have received a copy of the firm's latest coupling and gear catalogue (No. 101).

Holset flexible rubber block couplings and gears have been applied to a variety of industrial drives, ranging from quite small conveyor systems to the largest of rolling mill main drives. These couplings and gears are giving very satisfactory service under the conditions of heat, dirt, and atmospheric pollution met with in many industries. Users of the Holset coupling are impressed by its resilience and silence of operation combined with the further fact that no lubrication or maintenance is required. In addition, the unique design of the Holset coupling ensures that there is no backlash at all loads and speeds within its range. The foregoing are considered to be important features saving time and money. One of the tables in the catalogue shows the size range of Holset couplings from 0.03 H.P. per R.P.M. to size 180 H.P. per R.P.M. A size 180 coupling, which is to transmit 6,300 H.P. at 35 R.P.M. is shown in one of the diagrams included in the catalogue. The firm is, however, prepared to manufacture larger or special couplings to customers' requirements.—*Holset Engineering Co., Ltd., Turnbridge, Huddersfield (member of the B.H.D. Engineers Group).*

Incandescent Heat

From the Incandescent Heat Co., Ltd., we have received a handsome illustrated brochure showing the very wide range of industrial gas equipment which the firm and its many subsidiary companies both in this country and on the Continent manufacture and market for the discriminating buyer. The Incandescent Group comprises seven specialist companies, each an authority in its own particular sphere, responsible for its own research, design, and construction. Frequent interchange of data enables the members of the group to give expert advice on any phase of industrial heat engineering. The customer may therefore put forward his problems with confidence in the knowledge that the entire Incandescent organisation is at his disposal to carry out any necessary research and tests, and to select and offer the best form of equipment for any particular process or treatment. Equipment and processes mentioned in the brochure are fully detailed in separate leaflets which are available on request to the firm.—*Incandescent Heat Co., Ltd., Smethwick.*

Cleaning Outfits

From Allan Taylor (Engineers), Ltd., S.W.18, we have received an illustrated brochure showing and describing the firm's range of gas service pipe cleaning, syphon emptying, and mains cleaning outfits. The equipment has been especially designed to meet the requirements of gas engineers throughout the British Isles, on the Continent, and in many other countries. The outfits were first produced in 1925. Since then many improvements and new ideas have been incorporated according to demand and design. They have proved, and are proving, most economical in use by eliminating extensively the necessity of excavating, reinstatement, and replacement charges, thus giving a high increase in efficiency of gas distribution maintenance.—*Allan Taylor (Engineers), Ltd., High Street, Wandsworth S.W.18.*

The Divisional Controller of the Scottish Gas Board has informed the Town Council of Bathgate, West Lothian, that complaints from local users alleging a poor supply of gas have been investigated and it has been discovered that the gas pressure was adequate. The trouble lay in the supply pipes, which were either clogged or had outlived their usefulness. Steps were being taken to make replacements where necessary, but it would be some time before all this work could be executed.

GLASGOW HOUSEWIVES CLUB

The Glasgow *Evening Citizen* has sponsored a Housewives' Club, and organises free mannequin parades, demonstrations, and general entertainments, to which its members are invited to attend. Many members are drawn from the big new housing estates in and around Glasgow, and attendances have been up to 2,000 in number.

The first series of cookery demonstrations was given by Miss Helen Main, Chief Demonstrator of R. & A. Main, Ltd., in collaboration with the Scottish Gas Board, under the title 'Festive Fare.' In conjunction with these demonstrations, the Glasgow undertaking arranged the attractive window display (shown in our photograph) at the Sauchiehall Street showroom, featuring the Main No. 20 'Century' cooker, the appliance used by Miss Main during her demonstrations.

COMPRESSORS & EXHAUSTERS FOR AIR AND GAS.

See our Advertisement Next Week.

REAVELL & CO. LTD. IPSWICH.

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Quarterly Volumes of the 'Gas Journal'

5/- each, post free

Walter King, Ltd., 11, Bolt Court, Fleet Street, London, E.C.4.

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India-Rubber and Airproof Manufacturers and General Contractors.
LARGEST MANUFACTURERS OF GAS MAIN BAGS.
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Gas Bags for Repairing Mains

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HOSE AND TUBING FOR ALL PURPOSES.

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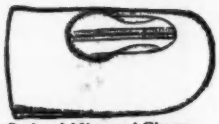

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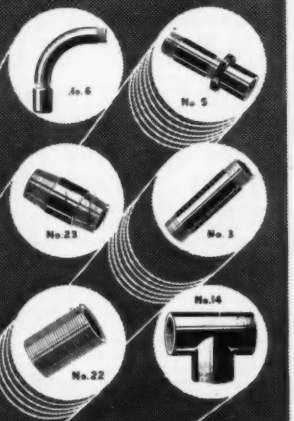
STEEL TUBES & FITTINGS
FOR
Gas, Water & Steam



TRADE MARK

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BRADFORD TUBE WORKS · WALSALL · ENGLAND

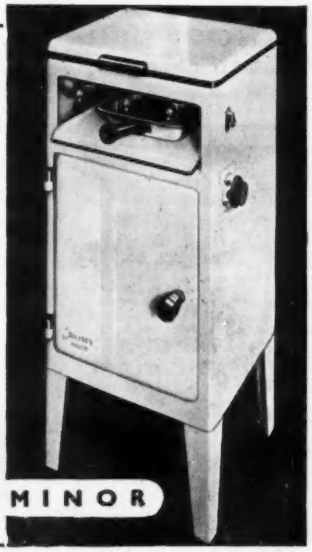
The Bradford Tube Works occupies a factory area of some three acres exclusively devoted to the manufacture of Steel Tubes and Fittings.
Contractors to Admiralty and War Office. Extensive stocks.

BIG Capacity for LITTLE Kitchens

Especially suited to the kitchens of flats and small houses, this highly efficient cooker provides utmost cooking capacity in the least possible space. Cast iron construction ensures strength and durability and reduces maintenance costs to a minimum, thus making the Dainty Minor particularly suitable for simple hire or hire purchase.

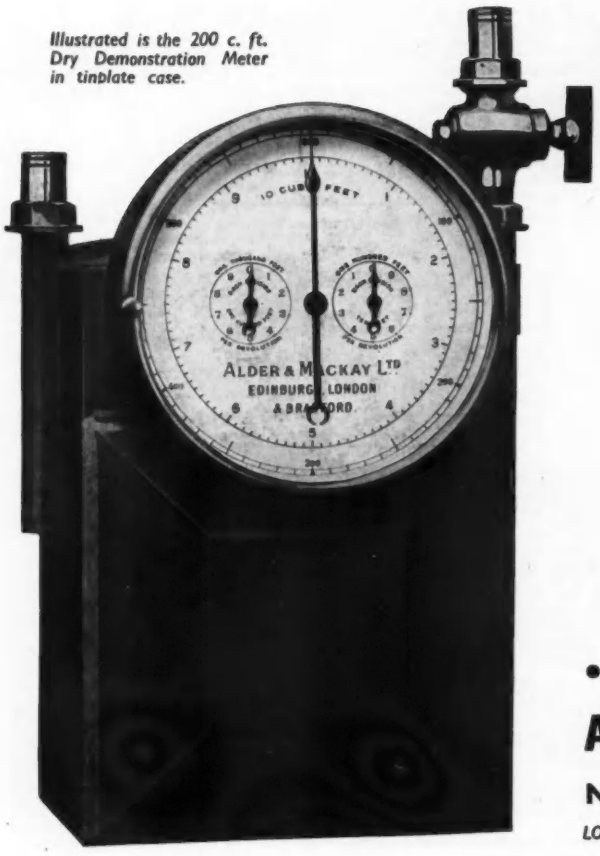
Approved and adopted by leading gas boards

The **Dainty** MINOR



R. RUSSELL & SONS, LTD., DERBY
Agents for Scotland and Northern Ireland:
JAMES R. THOMSON & CO. LTD., 41, YORK STREET, GLASGOW, C.2

Illustrated is the 200 c. ft. Dry Demonstration Meter in tinplate case.



IMPORTANT MEASURES

The 'A & M' DRY DEMONSTRATION METER

This meter is particularly useful for cookery or other demonstration purposes. The dial is 9" in diameter, and the meter is available in a variety of sizes. Complete details will be sent on request.

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Makers of Meters
New Grange Works, Edinburgh
LONDON · BRADFORD · MANCHESTER · BELFAST · CORK

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UNION FOUNDRY, MANSFIELD, NOTTS.
ALL TYPES OF DISTRIBUTION MATERIAL IN STOCK
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CONVEYORS, ELEVATORS, BUNKERS, ROOFS, HOISTS, Etc.

PUBLISHERS' NOTICE

The " Gas Journal " is published every Wednesday, price 1/3d.; by post 1/5d.

Subscription Rates: Home and Empire:—52/- per annum; Foreign:—60/- per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 1/9 per line (approx. 7 words)—minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep × 7" wide; block screen 120.

BUSINESS MANAGER : S. T. CULLEN

MIDLANDS MANAGER: G. B. Torrance, 42, Wychall Lane, King's Norton, Birmingham, 30.

NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. *'Phone:* Harrogate 84291.

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

Telephone: CENtral 2236-7. *Telegrams:* Gasking, Fleet, London.

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PALMERSTON HOUSE, OLD BROAD STREET, LONDON, E.C.2.

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FREE BOOKLET FOR YOU ON

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Fascinating, new, multi-coloured brochure, "Fire!—Your Dangerous Servant," can be yours. It tells you why to get Nu-Swift before your fire risk becomes 3-dimensional. Send for it—NOW!

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In Every Ship of the Royal Navy

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THE COOKER CLEANER

"KLEENOFF"

FIBRE BRUSHES
RUBBER MOPS

"KAY-DEE" *

KETTLE DESCALER

For retail to the public, and in bulk for Works use.

BAILE & CHURCH, LTD.
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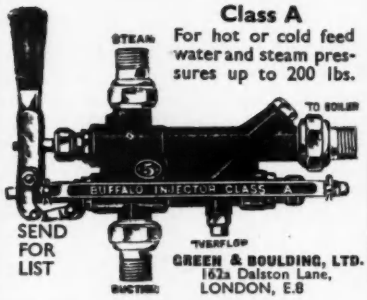
BUFFALO INJECTORS



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For hot or cold feed water and steam pressures up to 200 lbs.

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GREEN & BOULDING, LTD.
162a Dalston Lane,
LONDON, E.8

APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

EASTERN GAS BOARD

DISTRICT INSPECTOR

APPLICATIONS are invited for the position of DISTRICT INSPECTOR at the Maldon (Essex) Undertaking of the Board.

Applicants should be experienced in modern gas fitting practice and qualified to advise consumers, prepare estimates and direct the work of fitters.

The salary will be within Grade III, Prov. 'B' of the National Salary Scales for Gas Staffs, commencing at £445 per annum.

The successful applicant may be required to pass a medical examination.

Applications, stating age, qualifications, and experience, together with details of present and previous employment, should be addressed to Mr. F. N. Howes, Group Manager, Gas Works, Chelmsford, to reach him within fourteen days of the appearance of this advertisement.

JERSEY GAS LIGHT CO., LTD.

ASSISTANT ENGINEER

APPLICATIONS are invited for the position of ASSISTANT ENGINEER to the above Company.

Candidates for the appointment must be Corporate Members of the Institution of Gas Engineers or of the Institutions of Civil or Mechanical Engineers and should have had practical experience with Woodall-Duckham Continuous Vertical Retorts and with both high and low pressure distribution systems.

The salary will be £1000 rising to £1200 per annum by four equal annual increments subject to satisfactory services. The successful candidate will be required to pass a medical examination.

Applications stating age, whether married or single, details of qualifications, Training and experience, and accompanied by *copies* of testimonials should be addressed to: S.P. Pepin, Esq., O.B.E. B.Sc, M.Inst. Gas E., Managing Director, 97, Bath Street, St. Helier, Jersey, Channel Islands.

December 30 1953.

MORLEY PRODUCTS (PADIHAM) LTD.

SALES REPRESENTATIVES

APPLICATIONS are invited from suitably qualified persons for positions in the North and Midlands, also London and the South of England. The successful applicants will be required to live on the territory, and full details of training, experience, etc., should be given, also age and salary required. Contributory pension scheme is available and car provided. Applications should be addressed to: The Managing Director, Victoria Works, Padiham, Lancs., and the envelope endorsed 'Representative'.

SCOTTISH GAS BOARD

KILMARNOCK GROUP
DUMFRIES DISTRICT
ASSISTANT MANAGER

APPLICATIONS are invited for the post of ASSISTANT MANAGER with the Dumfries District Undertaking at a salary within Grade A.P.T VI/VII (£490 to £625 per annum), placing according to experience and qualifications.

Applicants should be fully conversant with the operation and maintenance of gas works plant and distribution systems. The carbonising plant consists of machine stoked horizontal retorts, which are in process of being replaced with vertical retorts. Experience with Carburetted Water Gas Plants will be an advantage.

If necessary, a House will be made available at a nominal rent.

Applicants should state if their present position is superannuated. The successful candidate may require to pass a medical examination before the appointment is confirmed.

Applications stating age, training, experience and qualifications, and giving names of two referees, should be addressed to the undersigned within fourteen days of the appearance of this advertisement.

S. C. JOHNSTONE,
Sub-Group Manager.

District Gas Works,
Dumfries,
December 19, 1953.

SCOTTISH GAS BOARD

KILMARNOCK GROUP
NEWTON-ON-AYR AND AYR DISTRICT
DEPUTY DISTRICT MANAGER

APPLICATIONS are invited from Corporate Members of the Institution of Gas Engineers for the post of DEPUTY DISTRICT MANAGER for the Newton-on-Ayr and Ayr Undertakings.

Applicants should have experience in the maintenance and layout of Gas Works Plant and Distribution Systems, and a knowledge of general office routine.

The duties of the successful applicant will be mainly concerned with the day to day running of the Ayr undertaking.

The salary applicable to the post will be Grade IX (Provincial 'A') of the National Salary Scale, £615 per annum rising to £715 by annual increments of £20 with placing according to experience and qualifications. A house will be available at a reasonable rent.

Applicants should state whether they are presently in a superannuated position, and the successful applicant may be required to pass a medical examination before the appointment is confirmed.

Applications giving full particulars of age, qualifications, experience and present position, and the names of two referees, should be lodged with the undersigned not later than January 30, 1954.

C. E. N. FRESHNEY,
District Manager.

Newton-on-Ayr Gas Works,
Ayr.
January 9, 1954.

(*Classified Advertisements continued on page* 114)

APPOINTMENTS VACANT (ctd.)

WALES GAS BOARD

ENGINEER AND MANAGER—

ABERCARN UNDERTAKING

APPLICATIONS are invited for the position of ENGINEER AND MANAGER of the above Undertaking.

The Undertaking is in receipt of supplies of gas in bulk and candidates for the appointment must have had administrative and sales development experience and possess suitable technical qualifications, particularly in respect of gas distribution.

The commencing salary will be within A.P.T. Grade XIIa (£740/865 per annum) in accordance with qualifications and experience.

The successful candidate will be required to pass a medical examination and join the Board's Superannuation Scheme.

Applications, stating age, qualifications and experience, together with details of present and previous appointments, and names of two referees, should be received by the undersigned not later than January 30, 1954.

C. B. MAWER,
Secretary.

2, Windsor Place,
Cardiff.

WALES GAS BOARD

PRODUCTION ASSISTANT

APPLICATIONS are invited from suitably qualified persons having practical gasmaking experience for the post of Production Assistant on the Technical Headquarters Staff of the Wales Gas Board.

The duties will include the collation of gas making returns from individual Undertakings at Headquarters level as well as practical advisory work at Undertaking level throughout the whole of Wales. Sound practical knowledge of carbonising and water gas practice is essential. The work will necessitate residence in Cardiff and applicants will be expected to travel as may be required.

The appointment will be within Grade A.P.T. IX(A) (£615/715 per annum), and will be subject to a satisfactory medical examination and entry into the Board's Superannuation Scheme.

Applications stating age, training, qualifications and experience, together with details of present and previous appointments accompanied by the names of two referees, should reach the undersigned not later than January 30, 1953.

C. B. MAWER,
Secretary.

2, Windsor Place,
Cardiff.

SOUTH WESTERN GAS BOARD

SENIOR HOME SERVICE ADVISER

CHELTENHAM SUB-DIVISION

APPLICATIONS are invited for the position of SENIOR HOME SERVICE ADVISER of the Cheltenham Sub-Division of the Board.

The appointment is graded A.P.T. VII—£436-£500 per annum.

Candidates must be capable of conducting lectures, cookery demonstrations and practical classes in addition to advising consumers in their own homes in the use and care of gas appliances.

The successful applicant will be required to pass a medical examination and to join the Board's Staff Pension Scheme unless she is otherwise ineligible in accordance with the rules of the scheme.

Applications, stating age, qualifications, present position, etc., together with the names of two referees, should be submitted to the undersigned within fourteen days of the appearance of this announcement.

A. L. MORRIS,
Manager.

North Street,
Cheltenham.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION

SHIFT SUPERINTENDENT—

LEICESTER UNDERTAKING

APPLICATIONS are invited for the position of SHIFT SUPERINTENDENT at the Aylestone Road Works. Grade A.P.T. VIII salary range £585/£665 per annum.

Candidates should have obtained the Higher Grade Certificate of the Institution of Gas Engineers, or its equivalent, and should be capable of controlling the day-to-day operation of the Works, which has a capacity of 12 million cu. ft. of coal gas and 7 million cu. ft. of C.W. Gas per day. Candidates should be conversant with the control of Glover-West C.V. Retorts and fully automatic Humphreys & Glasgow C.W.G. Plant, and the usual ancillaries.

The successful candidate may be required to pass a medical examination and unless already subject to a pension scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications stating age, qualifications, present position and experience, together with the names of two referees, should be addressed to the undersigned to be received not later than Wednesday, January 27, 1954.

H. B. TAYLOR,
Divisional General Manager.

Millstone Lane,
Leicester.
January 5, 1954.

LURGAN BOROUGH GAS DEPARTMENT

NORTHERN IRELAND

VACANCIES EXIST for the positions of WORKS FOREMAN and JUNIOR TECHNICAL ASSISTANT CHEMIST but with excellent opportunities for improved status.

Applicants should have in particular adaptability and a practical bent. A mechanical training whether obtained in Works scale operations or through the medium of home hobbies would be an advantage.

A contributory pension scheme is in operation.

Applicants should write to the undersigned giving at this stage details of past and in particular present responsibilities, remuneration received etc.

J. W. YOUNG,
Engineer and Manager.

Lurgan Gas Department,
Co. Armagh.

CITY COUNCIL OF SINGAPORE

GAS DEPARTMENT

APPLICATIONS are invited for the posts of ASSISTANT GAS ENGINEER and ASSISTANT DISTRIBUTION ENGINEER each on a 3 years' agreement in the first instance.

Applicants for the post of :—

(i) ASSISTANT GAS ENGINEER should be of good education and address and must possess the Higher Grade Certificate of the Institution of Gas Engineers in Gas Engineering (Manufacture) or alternatively the Ordinary Grade Certificate of the Institution of Gas Engineers in Gas Engineering (Manufacture) plus the Ordinary Grade Certificate of the Institution of Gas Engineers in Gas Engineering (Supply) (or equivalent) and should preferably be Associate Members of the Institution of Gas Engineers. It is essential that the appointee should be about 35 years of age with a sound experience of general administration and must have had extensive practical experience in Gas Manufacture, with preferably experience in Distribution. The appointee must be fully capable of supervising normal Gas Works routine, staff and labour concerned and should also be experienced in preparing plans for alterations to Works layout, installation and new plant, etc.

(ii) ASSISTANT DISTRIBUTION ENGINEER should be between 23 and 27 years of age and should preferably be unmarried. They must hold at least the Ordinary Grade Certificate of the Institution of Gas Engineers in Engineering (Supply) and it is desirable that they also hold the City & Guilds Certificate in Gas Fitting (Final Grade). They must have a good practical knowledge of gas fitting, mains and service laying and it is also desirable that they have a background knowledge of the modern application of gas in industry and experience of repairs to dry meters. Applicants must have had at least two years administrative and supervisory experience in the Distribution Department of a Gas Undertaking.

The commencing basic salary offered for the post of Assistant Gas Engineer is between $910 per month (£1,274 per annum) and $1,030 p.m. (£1,442 per annum) and for the post of Assistant Distribution Engineer between $550 p.m. (£770 p.a.) and $670 p.m. (£938 p.a.) depending on the appointees qualifications and experience.

If placed on the permanent establishment after satisfactory completion of the agreement the basic salary for the post of Assistant Gas Engineer will be in the scale $630 rising to $1,200 p.m. (£882 to £1,680 p.a.) and for the Assistant Distribution Engineer in the scale $550 rising to $1,070 p.m. (£770 to £1,498 p.a.)

Expatriation allowance and cost of living allowance at such rates as may be approved by the Council from time to time are payable. The existing rates are as follows :—

Expatriation Allowance—£287 per annum on basic salaries up to $740 a month : £343 per annum on basic salaries from $871 to $1,000 a month.

Cost of living allowance—£238 per annum on basic salaries of $550 to $910 a month and £224 per annum on basic salaries of $950 to $1,030 a month for a single man : £315 p.a. rising to £348 p.a. on basic salaries of $550 to $670 p.m. and £385 p.a. on basic salaries of $910 to $1,030 a month for a married man with no children : £412 p.a. rising to £471 p.a. on basic salaries of $550 to $670 a month and £560 per annum on basic salaries of $910 to $1,030 a month for a married man with one or more children.

For a single man the minimum total emoluments on a basic monthly salary of $550 and $910 would amount to £1,295 and £1,715 p.a. respectively : for a married man with no children £1,372 and £2,002 per annum respectively ; and for a married man with one or more children £1,469 and £2,177 p.a. respectively.

$1 equals 2s. 4d.

Partly furnished quarters provided if available at 6% of basic salary or housing allowance paid in lieu.

Passages—For the post of Assistant Gas Engineer, First Class Passage will be provided for appointee, his wife and own children under the age of 12 years at the date of sailing and for the post of Assistant Distribution Engineer, Tourist Class passages subject to a maximum of three full passages for each officer.

Leave—One month per year of service plus period of voyage, on satisfactory termination of agreement or 4 days a month of resident service plus voyage leave after 48 months if appointed to the Permanent Staff and thereafter at shorter periods. Fourteen days local leave per year.

Provident Fund—Compulsory Provident Fund contributions at present 7½% of salary to which the Council donate 7½% rising to 10% after 10 years' service, 15% after 15 years' service and 20% after 20 years' service. This scheme is under review.

Applications in duplicate giving full personal and technical information with *copies* of three recent Testimonials also in duplicate to Messrs. Allen & Williams, (Agents to the City Council), 1, Victoria Street, London, before S.W.1, Tuesday, January 26, 1954.

TECHNICAL SALES REPRESENTATIVE required by manufacturers of well-known Automatic Controls. To cover Industrial Departments of the Gas Boards, Heating & Ventilating Engineers, and large production units. Partly London and partly Midlands and Northern Counties. Good opportunity for energetic and experienced man. Apply in own handwriting, stating age, qualifications, and details of past experience. Apply : No. 178, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

WEST MIDLANDS GAS BOARD

BIRMINGHAM & DISTRICT DIVISION

ASSISTANT ENGINEER,

SWAN VILLAGE WORKS,

BIRMINGHAM DISTRICT

THE DUTIES will entail full responsibility for the operation of large installation of carbonising and/or carburetted water gas plants under the jurisdiction of the Works Engineer or his Deputy.

Candidates should have had extensive experience in the operation of continuous vertical retorts and automatic carburetted water gas plants and in the control of staff and labour. Corporate membership of the Institution of Gas Engineers is an essential qualification.

The commencing salary will be £925 per annum rising, subject to approved service, to £1,025 per annum.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications stating age, training, qualifications and experience, together with the names of two referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham, 15, to reach him within fifteen days of the appearance of this advertisement.

F. H. CURETON,
Secretary to the Board.

Amended Copy

EAST MIDLANDS GAS BOARD

LINCOLNSHIRE DIVISION

DIVISIONAL TECHNICAL ASSISTANT

APPLICATIONS are invited for the above appointment in the headquarters of the Lincolnshire Division at Lincoln. The appointment will be made in Grade APT 10 (£665-765).

Applicants should be well qualified academically and have sound experience of all types of gasworks plant. The successful candidate may be required to travel in the Division and to investigate efficiency in works operation ; to examine schemes for new plant submitted by Group Managers from the technical and economic standpoints, and to initiate and prepare such schemes. The successful candidate will be responsible to the Divisional Engineer.

The successful candidate may be required to pass a medical examination, and unless already subject to a pension scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications stating age, qualifications, experience, present position, and giving the names of two referees should be sent to the undersigned to arrive not later than January 26, 1954.

B. CLARKE,
Divisional General Manager.

East Midlands Gas Board,
Belle Vue House,
Carline Road, Lincoln.
January 1, 1954.

MISCELLANEOUS

SMALL single truckloads and larger quantities of good ROUGH BREEZE from any gasworks, large or small, in the United Kingdom required by merchants paying own railway tolls. Cash price and particulars to No. 9378, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

PLANT FOR SALE

TWO Bryan Donkin Rateau Turbo BOOSTERS, each 460,000 cu. ft., 25/26 in. water gauge pressure difference, with driving motors 60-h.p., 400/3/50, 2,920 r.p.m., and control gear. Overhauled by makers, not used since.—George Cohen, Sons & Co., Ltd., 58, Wood Lane, London, W.12. *Tel.*: Shepherds Bush 2070.

WANTED

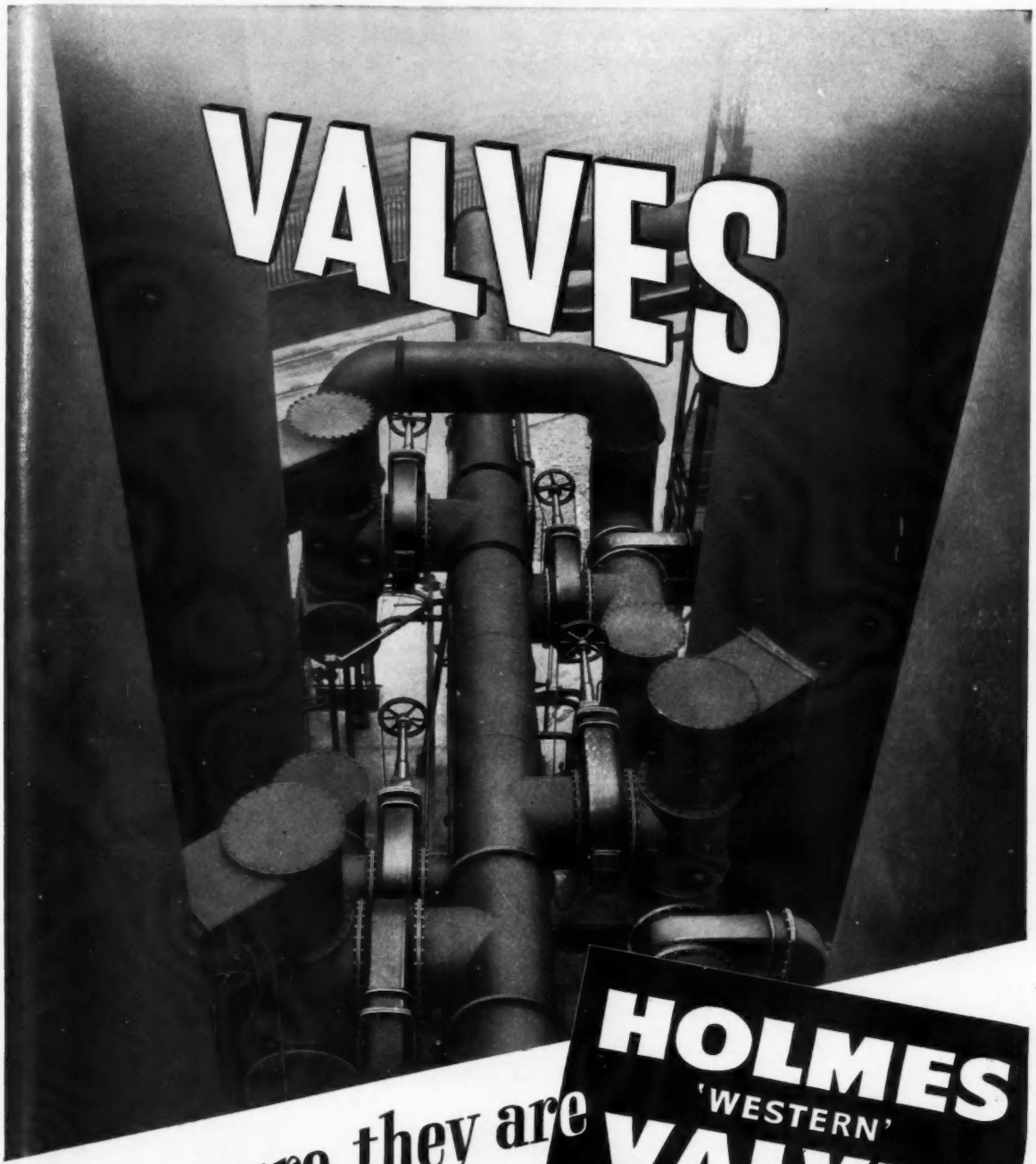
MERCURY

(QUICKSILVER)

Urgently wanted in any quantity ; containers supplied : keenest prices. Cash on collection London Area. Also precious and non-ferrous scrap metals in all forms.

BELGRAVE BUYERS (G.)

5, Belgrave Gardens, LONDON, N.W.8. MAI. 7513



make sure they are HOLMES 'WESTERN' VALVES

Some of the 42" rising spindle
Western Valves used for changing over Towers on the
Purifier Plant at the new Tingley Works

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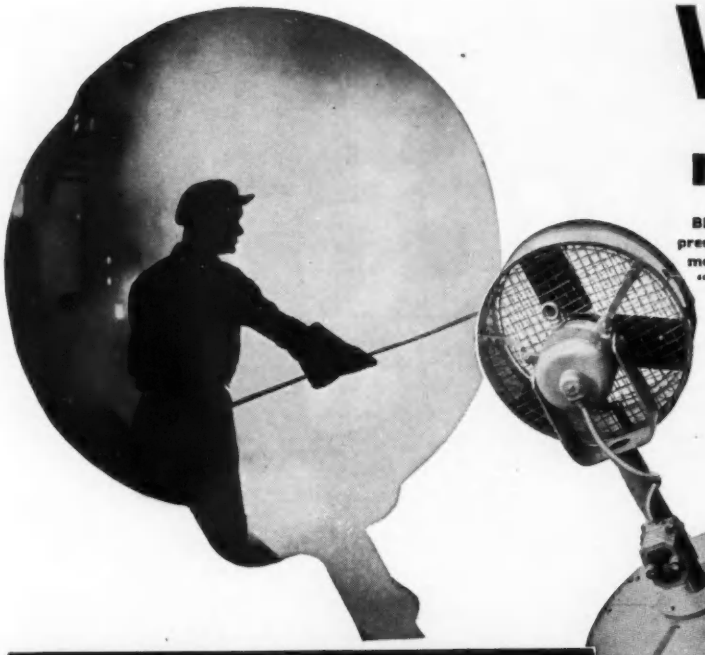

WHY

man-cooling?

BECAUSE MEN CANNOT WORK at full stretch under the oppressive conditions existing in industrial "hot spots" without some means of relief. Often they resort to "taking a breather". But "breathers" are costly and time-wasting.

Consider the alternative.

The "Tornado" method of man-cooling definitely encourages production all the time. Man-cooling fans deliver, for as long as is necessary, a brisk, cooling air current which relieves excessive body heat and improves breathing conditions. Designed particularly for use in the "heavy" trades they combine an easy portability with robust construction — two essential characteristics.

If your concern is for workers in iron and steel works, foundries, boiler houses, gas retort houses, glass works or "lighter" industries where efficiency is bound up with the maintenance of comfortable working conditions then you should see Publication No. 9/7.

A copy is waiting for you.

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Keith Blackman LIMITED

MILL MEAD ROAD, TOTTENHAM, LONDON, N.17

'Phone: Tottenham 4522 (twelve lines). 'Grams: "Keithblac, Norphone, London."

BRANCH OFFICES AT MANCHESTER, BIRMINGHAM, LEEDS, GLASGOW, NEWCASTLE-ON-TYNE, PENARTH near CARDIFF, AND BELFAST

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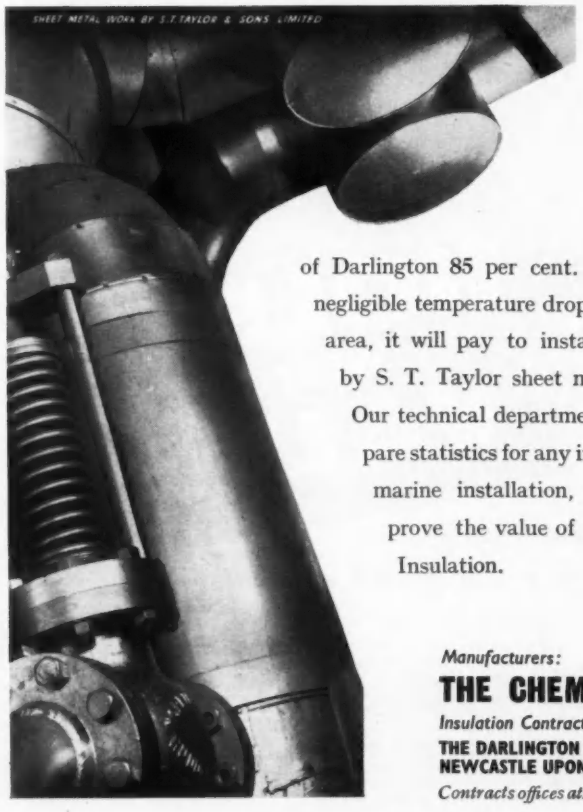

hidden heat

Surface temperature 110°F., yet underneath is a high pressure steam boiler feed line. Because of the efficiency of Darlington 85 per cent. Magnesia, the pre-heated steam reaches the boiler with negligible temperature drop, saving boiler fuel. No matter how small the hot surface area, it will pay to install Darlington 85 per cent. Magnesia Insulation protected by S. T. Taylor sheet metal work.

Our technical department will prepare statistics for any industrial or marine installation, which will prove the value of Darlington Insulation.

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Contracts offices at London, Birmingham, Bolton, Bristol, Cardiff, Glasgow, Leicester, and Sheffield

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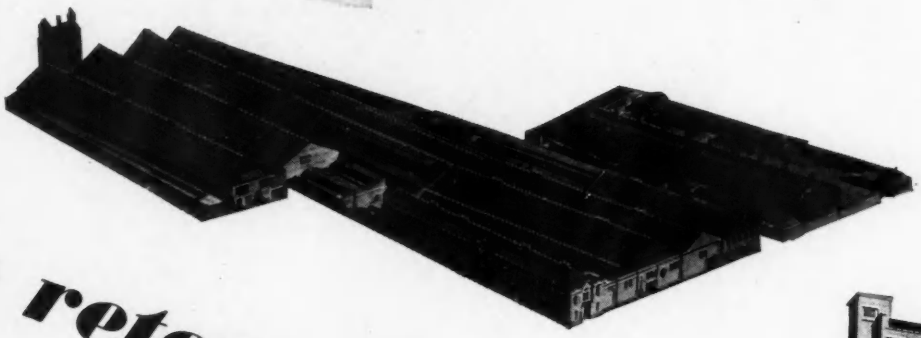
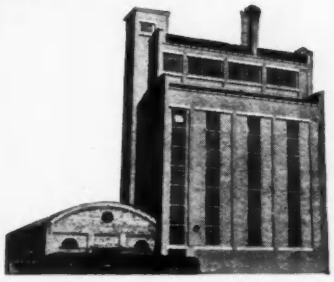
research plant



to retort house



Direct control over production is an important factor in the efficiency of Glover-West carbonization plant. Here, in our own Works, new devices are developed and tested on a full-scale research gas installation. Retort bench equipment and mechanical handling gear for Glover-West contracts are manufactured and assembled. Close contact between planning and construction contributes vitally to high performance in the finished plant.

WEST'S GAS IMPROVEMENT CO. LTD

ALBION IRONWORKS · MILES PLATTING MANCHESTER 10

Telephone : COLlyhurst 2961 Telegrams : Stoker, Manchester

London Office : Columbia House, Aldwych, W.C.2. Phone : HOLborn 4108-9 Grams : Wesgasco, Estrand

The gas fires the public want

The F.A. Neat gas fires are easy to sell because they provide splendid heating at very low cost. The secret is in the Neat burners, the high-efficiency radiants and the scientifically planned heat distribution.

The Neat burners have a quite exceptional performance. They:

Give perfect combustion with exceptional heat output for gas consumed.

Burn quite silently, there is no hiss even when the gas is turned down.

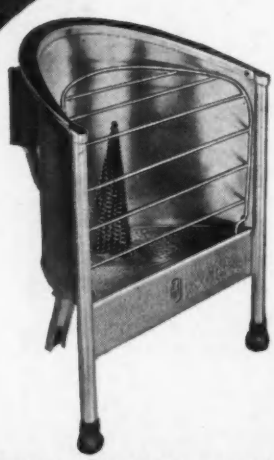
Cannot light back, however low the gas.

The two portable fires, FA/3 and FA/8, have unbreakable steel radiants, which have an *exceptionally* long life.

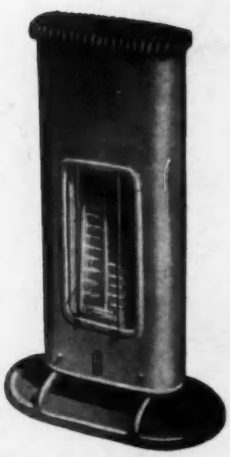
All F.A. Neat fires are made by the manufacturers of the famous Ascot gas water heaters to the same high standard of quality and performance.

To prevent accidents all models are fitted with guards conforming to the new British Standards Specification 1250.

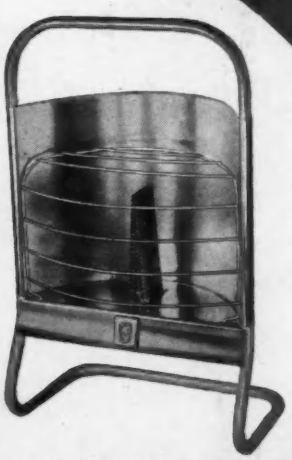
NEAT



'MIJ' PORTABLE FIRE FA/8
Stands 13 inches high.
Chromium plated reflector.



CONVECTOR FIRE FA/7
Stands 28 inches high.
Finished beige and chrome.



PORTABLE FIRE FA/3
Stands 19½ inches high.
Chromium plated reflector.

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